THE EXCAVATING ENGINEER
FOUNDED 1905

JUNE 1932
VOL. XXVI NO. 6

World's Longest Cofferdam Completed

Allen N. Spooner & Son, Inc., use Bucyrus-Erie 41-B cranes and McKiernan-Terry steam hammers to drive sheet piling in record time.

By Spencer A. Jones

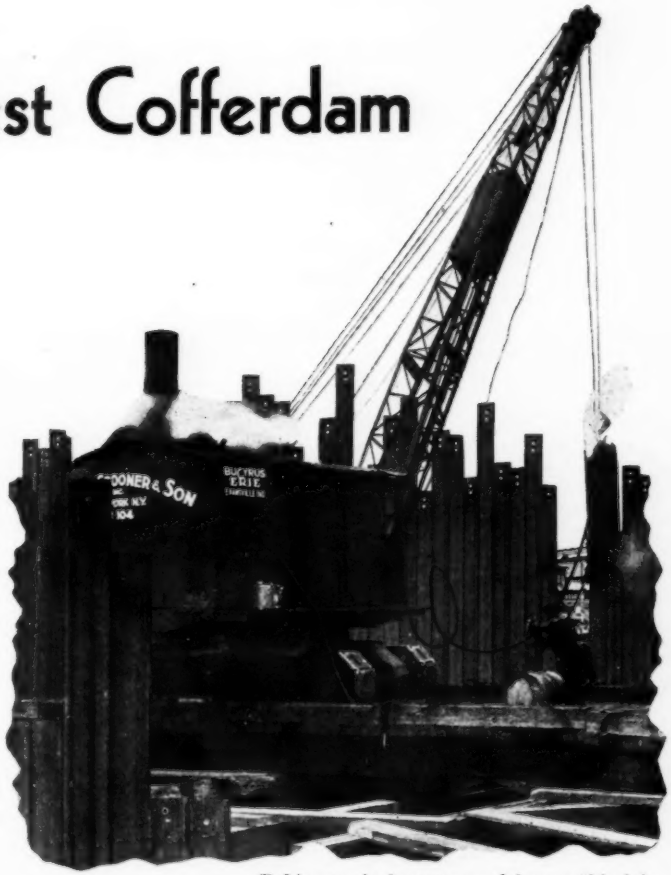
THE world's longest cofferdam has just been completed in New York City. More than 700,000 square feet of the bottom of the North River between the dam and the shore will soon be uncovered to a depth of 46 feet below mean low tide. Men and machines will work safely in the river bed behind an earth-filled, interlocking steel barricade 2,000 feet long.

Such an area exposed at this depth is something hitherto unheard of in engineering construction. It is, in fact, equal to a dry path across the Red Sea 20 miles long and 20 feet wide, figuring the Red Sea at 8 feet average depth. Egyptians, familiar with Bible history, will probably avoid this job.

After pumping out the 120,750,000 gallons of North River water behind the giant cofferdam, hard rock excavation will commence in the 18 acres between the cofferdam and the shoreline.

Three more piers for New York City

The cofferdam was built to enable the construction of three great piers, each projecting 1,100 feet from the slip wall line out into the North River; each 125 feet wide and with slips 400 feet wide between them. Each pier will have a 10-inch reinforced concrete floor.



Taking on fuel means no delay on this job.

The City of New York Department of Docks planned these piers and slips to accommodate the longest, widest, deepest draft vessels afloat. Each slip will accommodate two vessels larger than the Leviathan.

These piers are to be called Numbers 88, 90 and 92. They are located at the foot of West 48th, 50th and 52nd Streets on the west side of Manhattan Island.

The contract for the substructures of these piers, including the reinforced concrete floors and column footings for the superstructures, the removal of rock in the slips between them and the dredging of the entire slip areas to a minimum depth of 46 feet below sea level was awarded to Allen N. Spooner & Son, Inc., of New York City at a bid price of $4,099,000.

Unusual Problems solved

The piers are supported by concrete foundation walls and by interior concrete columns. The con-

crete foundation walls enclose a space running from the slip wall line out to the minus-46-foot solid rock contour line. This made possible concrete-to-bedrock support for the piers for distances of 280 to 420 feet from the slip wall line, depending, of course, on the rock contours. Beyond these concrete foundations the piers are supported on wood piles.

Between the piers the rock is to be removed down to the minus-46-foot level.

The bottom of the cofferdam rests on bed-rock which slopes irregularly. On the river side there would be the tremendous pressure of 46 to 52 feet of water, depending on the tide. Besides this there is the remote possibility that some vessel out of control or be-fogged might collide with the cofferdam.

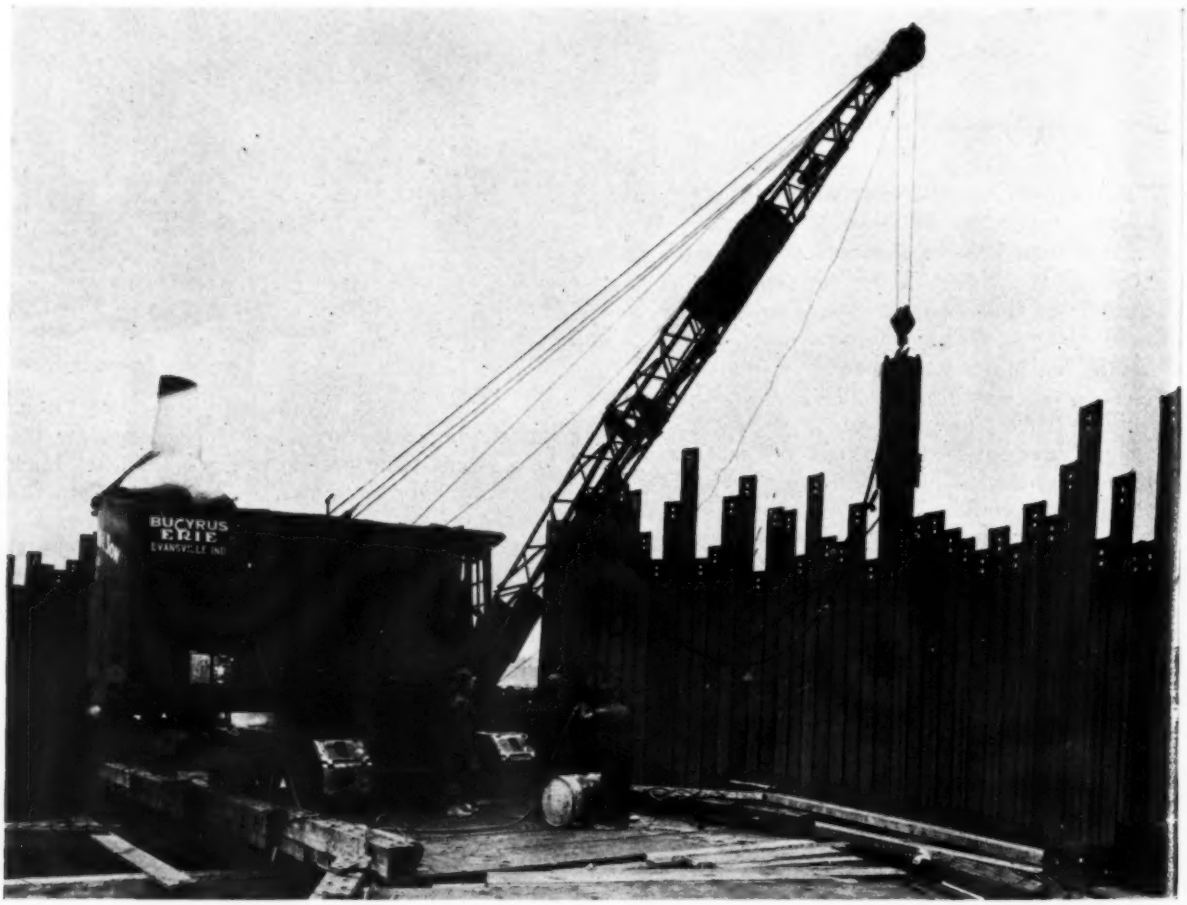
It was decided to construct a cofferdam composed of 43 earth-filled, interlocked, arc pockets, each pocket about 50 feet from crossbrace wall to crossbrace wall and 50 feet thick between extreme projections of arcs. The shore side of the dam is to be braced with a rip rap bank of rock from the slip excavations. The cofferdam, as constructed, extends from the shoreline to about 400 feet out into the river, thence roughly parallel to the shoreline for a distance of 1,400 feet and thence back again to the shoreline.

Foresight speeds job safely, economically

W. A. Morton, General Superintendent for Allen N. Spooner & Son, Inc., determined to find out the slope of the rock under the entire cofferdam. He believed that with this knowledge he could cut the sheet piling for the dam to exact lengths and thus have no piecing out or trimming to do after the piles were driven.

Careful test borings were made and accurate contours located which made it possible to order cut to correct length each of the 5,000 or more pieces of Lackawanna steel sheet piling and the marking of each piece for its exact position in the cofferdam.

The results obtained from this preliminary investigation far more than compensated for the expense of making the test borings. An idea of the accuracy with which the work was done may be obtained by a glance at the completed coffer-



Oil-burning Bucyrus-Erie 41-B crane carrying a B-2 McKiernan-Terry steam pile driver at end of 50-foot boom and sinking Lackawanna steel sheet piling at rate of 180 pieces per day. Pile driver unit weighs 6800 pounds. Note portable decking on I-beams.

General view of job looking northwest. Note even tops of steel sheet piling. I-beam truck tracks in foreground. Trucks carrying rip rap rock use two beams overhanging water. Pockets in foreground are nearly filled with earth. Entire body of water where pile driver is floating in middle distance (about 6 city blocks) will be pumped out and excavated down to minus-46-foot elevation.

dam and noting how little variation there is in the heights of any two adjacent sheet piling.

More than 360,000 feet of steel sheet piling was used. Some lengths were over 95 feet; others less than 60 feet. The average length was 75 feet. 121 pieces were required for each of the 43 pockets.

Oil Burners added to 41-B cranes

Two 41-B Bucyrus-Erie cranes with 50-foot booms were used with 9-B-2 McKiernan-Terry steam hammers for driving the sheet piling. These cranes were selected specially for this work because of their reputation for reliability and the exceptionally dry steam they produced. They had just completed a job of shoveling in hard rock; were changed over to cranes and used for hoisting muck; then merely washed, tightened up and repainted.

Before going on the pile driving job, both cranes were equipped with Number 1 W. N. Best Corporation Hy-Pressure oil burners with Duplex controls and steel supported combustion chambers lined with firebrick. The coal bunkers were replaced with 200-gallon tanks, although it was found that the 41-B cranes used only 150 gallons of 20° Baumé oil per day to furnish steam both for cranes and pile hammers.

One crane kept two derricks busy

The Lackawanna steel sheet piling, cut to length and marked for position, was set in position by two floating derricks, one with 120-foot and the other with 140-foot boom.

Two derricks served one 41-B crane used for driving. One of these derricks was on the river side of the dam; the other on the shore side. Both derricks, working together, were able to set about 180 pieces of piling per day—about 1½ complete pockets—but one 41-B crane with the 6,800-pound steam hammer dangling and thudding at the end of a 50-foot boom was able to take it easy and still keep well ahead of the two water machines though the standard boiler was called on to supply steam for traction, hoisting and for the 9-B-2 McKiernan-Terry steam hammer.

Mike Erickson, Assistant Superintendent for the contractor, says, "The water derricks simply couldn't keep up with the cranes. The 41-B's were set for 125 pounds and they were popping off nearly all the time. What's more, we didn't have a breakdown."

How the cofferdam was filled

Before any sheet piling was driven, floating pile-drivers sunk 60 to 90-foot wood piles, three trans-

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Shovel excavating tosca. In the background can be seen the piling with inside bracing, and in the distance the Retiro Station of the Buenos Aires, Pacifico Railway.

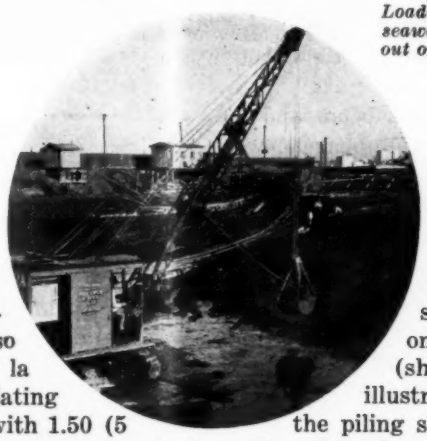
Excavating for foundations in Buenos Aires

Arienti y Maisterra put through difficult project for Argentine State Railway Building in record time.

(Editor's Note: The following article describing the solution of a rather difficult excavating problem is interesting not only for that reason, but also as a concrete example of the fact that the possibilities and economies of mechanical excavation are as well known south of the equator as north of it.)

WHEN the well-known Argentine contracting firm, Arienti y Maisterra was awarded the contract for the reinforced concrete work in the new Administration Building of the Argentine State Railways (Edificio para Administracion, Ferrocarriles del Estado), they were immediately confronted with a real excavating job as their contract included the preparation for and construction of the foundations, as well as the reinforced concrete structure itself, on a time penalty basis.

The building, which is a seven story structure occupying a ground area of approximately 100 meters by 85 meters (328 feet x 279 feet), will house the administrative departments of State Railways. The site chosen lies in the "New Port" (Puerto Nuevo) area of Buenos Aires, which is built-up ground, recovered from the Rio de la Plata in much the same way that Chicago's lake front is being extended to serve that city's growing needs; that is, by dredging. But in Buenos Aires dredging serves a two-fold purpose, to keep open the ocean liner channels in the river, which is normally not deep enough to accommodate the large trans-Atlantic liners constantly entering and leaving that busy port, and to supply "fill" for extending the land along the waterfront for addi-



Loading silt, frequently containing much seaweed refuse, into Decaubille cars drawn out on inclines at the corner of the enclosure.

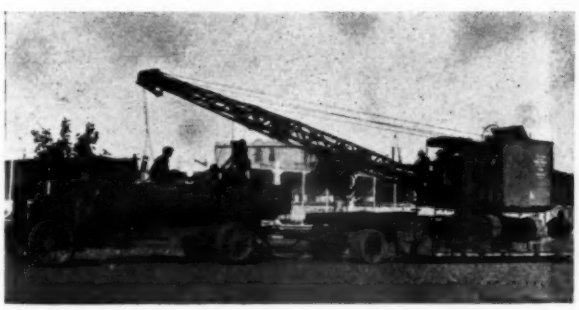
tional docking facilities as well as for enlarging the commercial area of the city.

Thus the administration building will stand on what was not so long ago the bed of the Rio de la Plata. At the moment of initiating the work, the area was covered with 1.50 (5 feet) meters of water. Below the water lay 2.30 meters (7½ feet) of silt and mud which had been pumped there some time previously by a 24-inch Bucyrus-Erie dredge pump driven by a 500 H.P. General Electric motor owned by the Argentine Government, Department of Public Works (Ministerio de Obras Publicas). This pump is permanently installed in the vicinity as a booster for moving material excavated from the river channels by numerous sea-going type dredges to the areas to be filled in on the river front.

"Tosca" Beneath the Mud

The silt rests upon the natural river bed which is compact red clay combined with "Tosca". Tosca is a material peculiar to Argentina, comparing in toughness to what is commonly known in the States as hardpan. An excavated face will stand vertical for years, and it is tough enough to cause a shovel to tip on its caterpillars if the dipper is deeply embedded, but it can be dug with a shovel without blasting if a little care is exercised to avoid "digging in" too deep. When it does give way, it breaks down into relatively small pieces. Arienti y Maisterra had to excavate this "tosca" to an average depth of 2.5 meters (8.2 feet).

To begin with they had to enclose the area with sheet piling. Larsen 8-inch steel sheet piling was driven in a rectangle measuring 100 meters by 120 meters (328 feet by 394 feet). The piles were sunk into the tosca some 3 meters (about 10 feet). A steam hammer was employed, steam being furnished by the boiler of an Orenstein & Koppel steam shovel which was used only as a steam generating plant (shown in one of the accompanying illustrations). The inside bracing for the piling served also to support a service path and track around the enclosure.



Hauling the Bucyrus-Erie to the job on a Fruehauf trailer.

Unusual Materials Make Excavation Difficult

Upon the completion of the piling enclosure, the area was drained with a 12-inch pump driven by a 100 H.P. General Electric motor, and then Arienti y Maisterra were ready to tackle the excavation for the foundations. This was no simple problem on account of the combination of materials encountered. It would have been quite impossible to drive any kind of an excavator over the filled-in silt, for even with mats, it would have sunk out of sight. Neither was it possible to get down to hard "tosca" without first removing the silt over a very wide area as it would not stand up at a steep incline but tended to flow into the hole excavated.

1020 converted to dragshovel for excavation of trenches in suburbs of Buenos Aires.

Arienti y Maisterra, overcame this situation very effectively with a ½ cubic yard Bucyrus-Erie excavator with Atlas Diesel drive, employing both clamshell and shovel front-end equipments. Even though the time element was important, a larger machine was not considered, as the comparative lightness and flexibility of the ½-yard excavator admirably suited the conditions.

Bucyrus-Erie 1020 Worked From Platform

A platform, sufficiently stout to support the 1020, and only slightly below the level of the surrounding ground was laid down on wooden piles driven into the "tosca". The platform was only wide enough to support the machine and a 60 cm. track on either side of the caterpillar mounting.

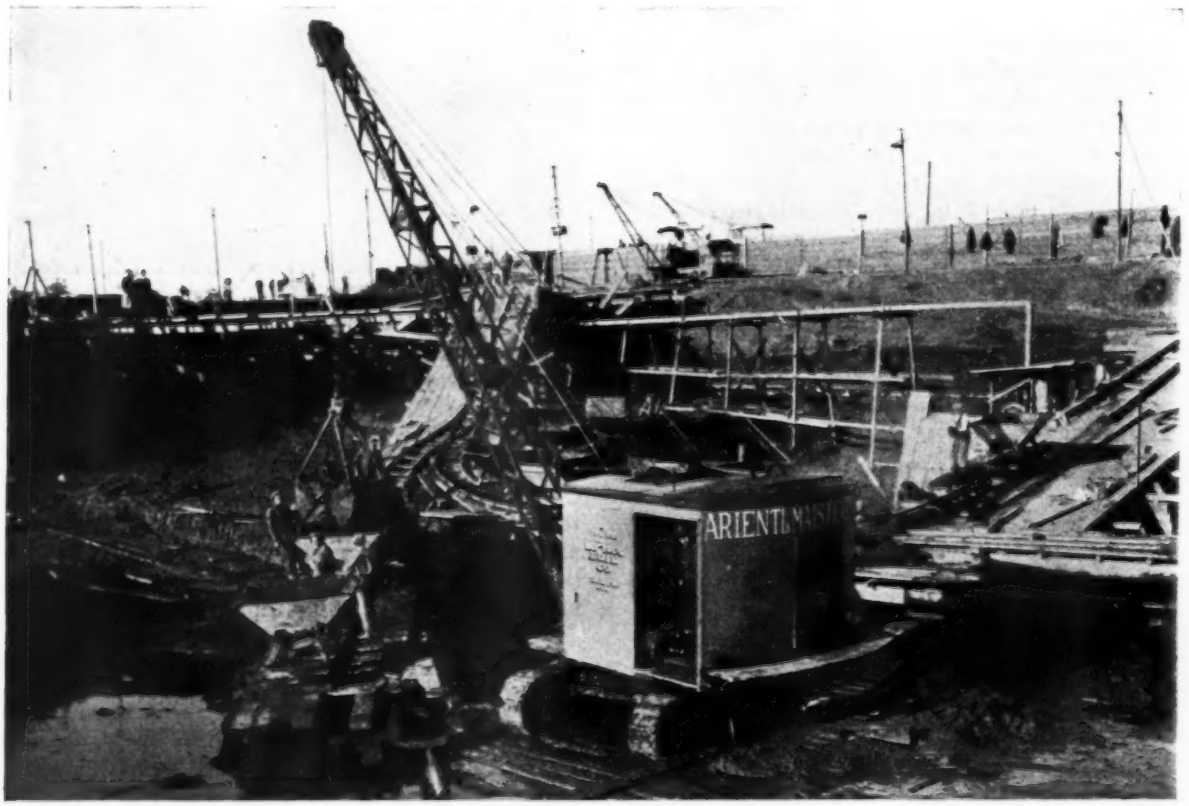
Showing arrangement of cars on platform and great pick-up capacity of Blaw-Knox bucket in this material.

The 1020 equipped with a 35-foot boom and ½ cubic yard Blaw-Knox clamshell bucket, was driven onto the platform and from this position was able to excavate the soft, muddy silt without difficulty. It loaded into Decauville cars which were hauled off the platform by a cableway winch and combined "on mainland" into trains to be hauled to the dump by Diesel locomotives. The whole idea was to keep the weight on the platform as low as possible so as to avoid unnecessarily heavy temporary piling.

The scheme worked admirably well. Pitmen underneath the platform cleaned out the silt between the piles throwing it beyond the platform where it could be picked up by the clamshell, and on occasion the boom of the clamshell was lowered to give an operating radius of 35 feet. In this manner, the clamshell excavated over an area 70 feet wide and 35 feet longer than the platform itself. In spite of the tendency of the muddy silt to flow, this left a sufficiently large area of hard tosca to allow the 1020 to go down into the pit. Moreover, during the couple of weeks that the platform was constructed and the machine used as a clamshell on the platform, the silt dried out considerably, which lessened its tendency to flow.

½-Yard Clam Fills 1-Yard Car at Each Pass

Being soft silt, it was very easily excavated with the clamshell. In fact the bucket, which is a Blaw-Knox No. 606 bucket rated at ½ cubic yard, was able to pick up sufficient material to fill the 750 liter (1 cubic yard) water level Decauville cars at one pass. Working as a clamshell in this material, the 1020 maintained an output of 320 cubic meters



The 1020 goes to work in pit. At left can be seen the ramp constructed out of the previous platform by merely sawing off the piles and lowering the platform proper.

(over 400 cubic yards) per 8 hour shift, working two shifts a day.

When the 1020 clamshell had cleaned up a sufficient area over the tosca, it was propelled off the platform, and the piles were cut off so as to permit the laying down of a 30 degree incline ramp,

Two heaped dippers—one heaped car.

the length of the original platform having been calculated with this purpose in mind. The 1020 then walked down into the pit. As some wet silt still remained around the bottom of the ramp, mats were employed, but after a few days this was cleaned away sufficiently to permit the excavator to walk on the surface of the firm tosca.

Incline tracks were laid down at each corner of the enclosure with a gasoline engine-driven winch at the head of each incline. Loaded cars, in trains of four, were drawn out of the pit on cables with the winches, and on the surface were consolidated into eight car trains for haulage to the dumps by Diesel locomotives. The haul was very short as the excavated material was dumped immediately outside the piling to build up the surrounding area. This diminished the seepage of water into the pit.

The excellent organization of this multiple transportation system assured a continuous and adequate supply of cars for excavator and contributed largely to the rapid progress made. The clamshell equipment was used for excavating all of the silt and muck lying on top of the firm tosca, the 1020 itself standing on the tosca. This method was chosen because the longer operating range of the clamshell equipment enabled the excavator to remain at a greater distance from the work than would have been possible with shovel equipment, thus avoiding trouble from the caving in and flowing of the soft banks. Moreover, the excellent "pick-up" capacity of the Blaw-Knox bucket in this material was an additional advantage.

"Lugging" Power of Diesel Advantageous in Tough Digging

Upon the removal of all of the mud and silt, the clamshell equipment was replaced by rope-crowd shovel equipment to excavate the hard tosca. Though the 1020 was frequently raised off its caterpillars when the dipper dug deeply into the bank, and although in several places where particularly hard tosca was encountered explosives were used, it experienced no great difficulty excavating the tosca, due principally to the remarkable "lugging" power of the Bucyrus-Erie Atlas Diesel engine. After cutting its own incline to the ultimate bottom of the pit, it worked against a bank averaging some 2.5 meters (8.2 feet) high. The tosca being fairly dry by this time, it could be heaped high enough in the one cubic yard water level Decauville cars to actually give a load well over one cubic yard, which ideally suited the 1020 ½ cubic yard dipper, two heaped dippers—one heaped car.

As a shovel, the 1020 worked three 8-hour shifts and maintained an output of 240 cubic meters (over 310 cubic yards) per 8-hour shift, which was somewhat less than the output of the clamshell, partially because the tosca was more difficult to excavate, and partially because the "pick-up" capacity of the ½-yard clamshell bucket in the muddy silt was somewhat greater than that of the ½ cubic yard dipper in the dry, firm tosca. Nevertheless, a maintained output of 310 cubic yards per 8 hours is still an excellent performance for a ½-yard shovel under the conditions encountered.

For the duration of the job, the Diesel fuel oil consumption varied from 35 to 40 liters per 8 hour

Shovel finishing up the last corner cut as form and concrete work catches up with excavation. Note hardness of tosca in the bank.

shift. The cost of the fuel oil delivered to the machine was 5 U. S. cents per liter (18 U. S. cents per gallon),* which resulted in a fuel expenditure of less than $2.00 per day, that is about 0.8 cents per cubic meter in tosca and 0.6 cents per cubic meter in silt. This fuel economy was directly due to the use of a full Diesel engine for the power plant of the excavator.

Total Excavation 52,974 Yards

The total amount of excavation required was 40,500 cubic meters (52,974 cubic yards). That

(Continued on page 313)

* EDITOR'S NOTE: The cost of Diesel fuel oil is higher in Argentina than in the U. S., but gasoline is relatively higher as well.

Heavy Work on Ute Pass Road

Hamilton & Gleason Company uses dynamite and shovels to open modern highway. . .

By Joseph C. Coyle

CARVED from solid granite cliffs along the route of the old Ute Indian trail, near Manitou, Colorado, four miles of modern automobile highway were opened April 1st to traffic. Heavy work, with dynamite and power shovels characterized the job, which was let to the Hamilton & Gleason Company, of Denver. It was necessary to close the road through the pass, a section of U. S. south 40, so the improvements were made during the winter months when traffic was lightest. Some of the old roadway was used as a starting point, but the construction was largely on new location and ranges in width from 30 to 60 feet. By shifting the roadway several steep grades were eliminated, the maximum grade on the new section being 7 per cent.

The work was carried on from both ends of the project, the contractors employing about 200 men. Double shifts were employed on much of the blasting. The rock cuts were shot down in benches, using 20-foot lift shot starting on grade and slope shots of the same depth. Fifteen Gardner-Denver jackhammers were used, also two compressors of the same make, one Schramm and one Ingersoll-Rand. Air from these was piped along the mountain above the blasting zone. On the upper, or west end of the project, air was piped from a 70-C Bucyrus railroad shovel, which was converted into a compressor unit and spotted on a spur.

Free-running blasting powder loaded by compressed air

A large percentage of the excavated rock was loaded on dump trucks and crawler wagons by two Bucyrus-Erie steam shovels, a 30-B and a 50-B, and two Lorain 75's and hauled to curves which were straightened out, though these hauls were invariably short. The shovels were moved back and forth along the project, as various points were loosened by blasting. Du Pont No. 2 Red Cross free-running blasting powder was used in the drill holes, being introduced through a brass tube inserted in the hole and connected to the air line. The use of brass was to eliminate danger

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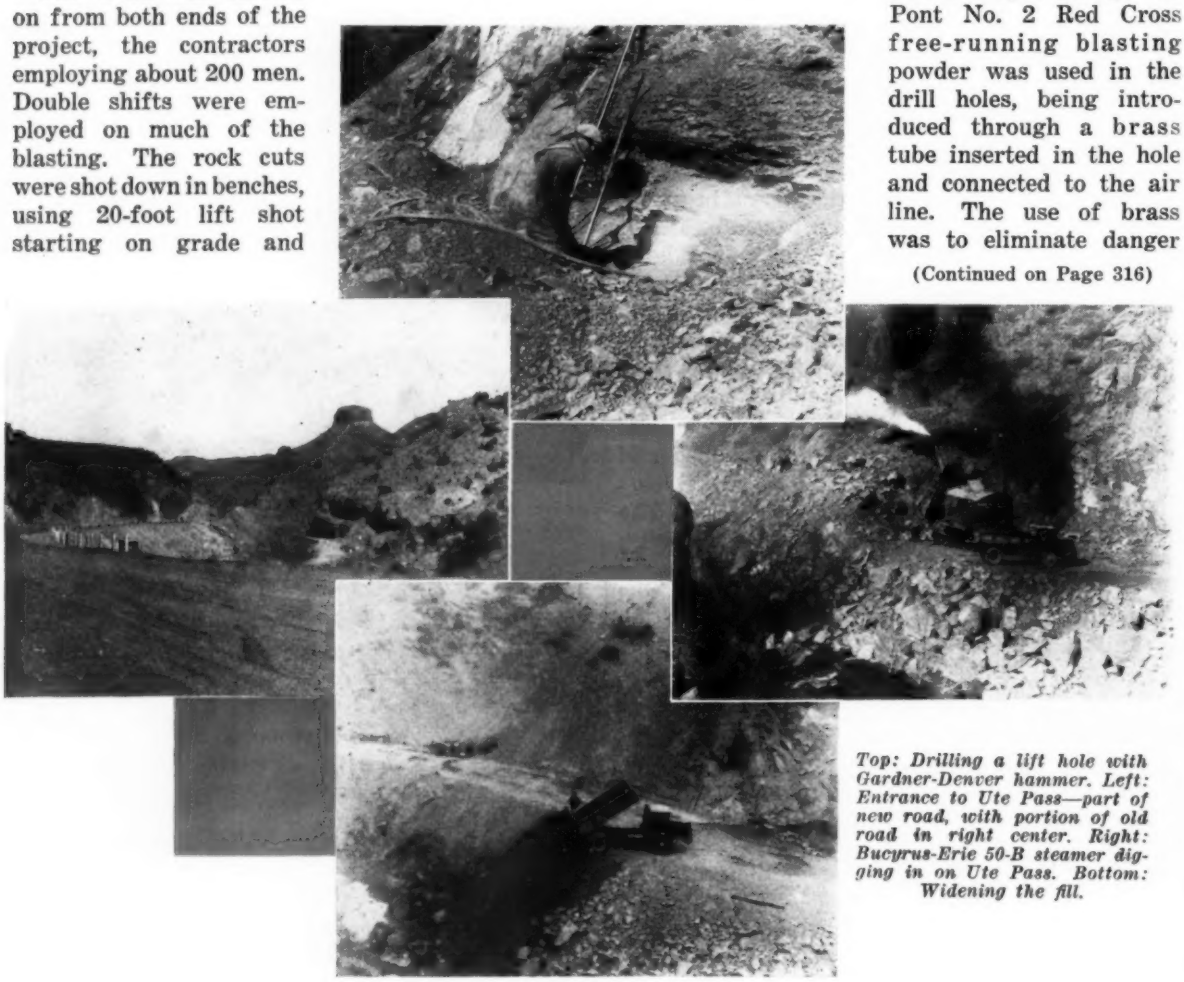
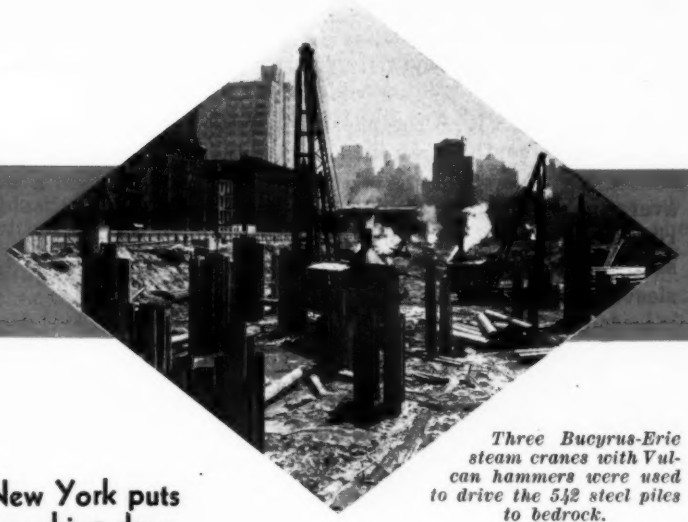


Top: Drilling a lift hole with Gardner-Denver hammer. Left: Entrance to Ute Pass—part of new road, with portion of old road in right center. Right: Bucyrus-Erie 50-B steamer digging in on Ute Pass. Bottom: Widening the fill.

When Specialists Drive Piles



Three Bucyrus-Erie steam cranes with Vulcan hammers were used to drive the 542 steel piles to bedrock.

Pierce Steel Pile Corporation of New York puts down 12,005 feet of piling in 37 working days.

By William Kauffman, C. E.

WHEN you have a difficult pile driving, foundation or caisson job call on the Pierce Steel Pile Corporation, engineers and contractors of 500 Fifth Avenue, New York. That's their specialty and they know piles and pile driving from A to Z. They handle not only steel piles but concrete and wood piling as well.

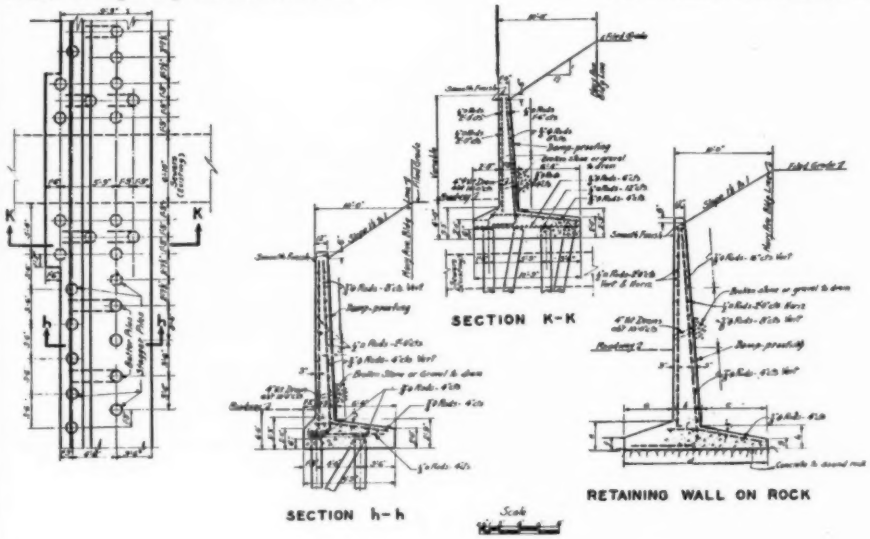
Recently they completed a tough job of driving 542 steel piles ranging in length from six to forty-five feet for the Board of Transportation of New York. The work was to support buildings and a retaining wall approximately 700 feet in length in the Grand Concourse Railway yard at 205 St. and Jerome Avenue, New York City.

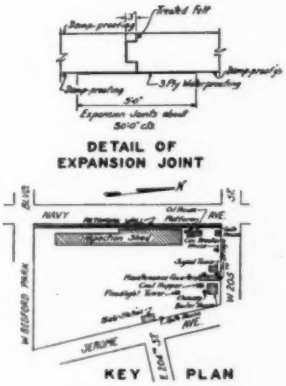
Due to the nature of the ground, extreme care was necessary in driving the piles in accurate position. The ground was largely quicksand with boulders aplenty and of all sizes.

The foundation work was contained in an area of about ten acres necessitating much moving of plant and material. In spite of these difficulties the entire job, totalling 12,005 feet of piling, was completed in 37 working days.

The work was handled by a Bucyrus-Erie 42-B and two Bucyrus-Erie B-2 pile drivers using Vulcan hammers. Proper equipment was a controlling factor in completing the work successfully and economically and the Bucyrus-Eries proved their mobility, adaptability and all round efficiency in the performance of this contract.

The material overlying rock on this site was largely quicksand, and, the lot having been used in former years as a dumping ground for excavated material, numerous boulders of sizes ranging from one-man to derrick stones were encountered while driving piles. For this reason friction





Diagrams showing how retaining wall was built on piling. Batter piles were driven to provide horizontal resistance.

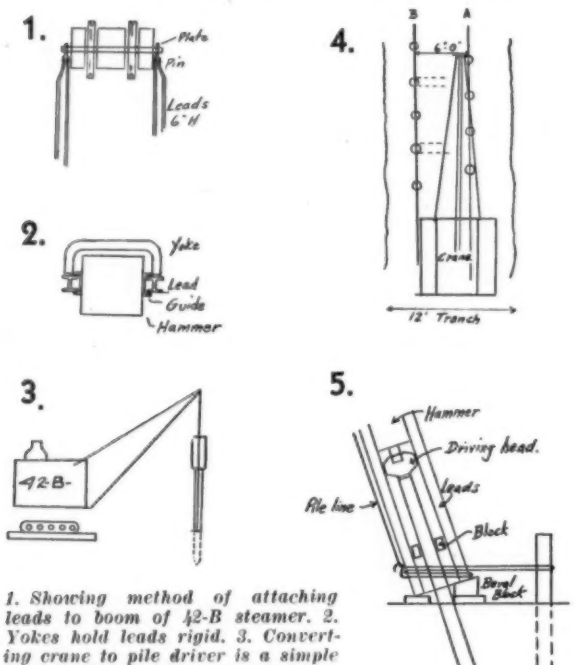
piles were specified. Rock elevation varied from six to forty-five feet below ground surface.

Extreme care had to be taken to drive the piles in accurate position owing to the nature of the ground. Here we see the three Bucyrus-Erie steam cranes, rigged as pile drivers.

As shown in Fig. 6 the piles consisted of a steel shell five-sixteenths of an inch thick and ten inches inside diameter. The points are of malleable iron, average thickness seven-sixteenths inch, with four ribs as stiffeners. The point is a driving fit to insure water tightness. In splicing piles an outside sleeve was used, also of malleable iron. This sleeve was found to be reasonably watertight, but in a few cases where leakage occurred the piles were pumped out before concreting by means of a siphon, steam being supplied from the boiler on the crane. Piles were driven to refusal being called "home" at twenty blows to the inch. They were then cut to grade and concreted. These piles were assumed to carry a safe load of thirty tons each.

Boulders Make Driving Difficult

The Bucyrus-Erie was converted into a pile-driver by attaching leads to the boom as shown in Fig. 1. The connecting plate is of seven-eighths iron and has pin holes to match the boom pin and is pin connected to the leads. The hammer is then raised within the leads. The leads were designed to fit a No. 2 Vulcan, the hammer used throughout the job. The hanging of leads and hammer, thus converting crane to pile-driver, can be done in a very short time—no more than fifteen minutes. Thus the crane became a complete self-centered pile driving unit, supplying power for three lines, hammer and siphon. At times when the crane was to be used as a lifting unit, the leads were pulled back to the machine by block and fall, this allowing sufficient clearance to operate the pile-line.

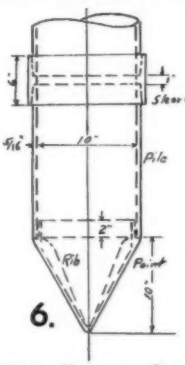


1. Showing method of attaching leads to boom of 42-B steamer. 2. Yokes hold leads rigid. 3. Converting crane to pile driver is a simple job requiring no more than fifteen minutes. 4. Piles under the retaining wall were spaced on 4-foot centers in rows 6 feet apart. Alternate piles in row "B" were driven at an angle. 5. Method of holding leads rigid with pile line for driving at an angle.

The leads were set on wood blocks, plumbed by moving the crane and the pile. Some difficulty was met in holding piles vertical due to hitting boulders, but this was overcome by using the pile-line.

Batter Piles Driven True

The piles under the retaining wall were in two rows six feet apart and spaced about four feet on centers along the rows as shown in Fig. 4. In row B alternate piles were sloped to provide horizontal resistance. The crane was confined within the limits of a trench twelve feet wide.



This diagram shows the way sleeves and points were fitted to the steel piles.

In driving the batter piles the pile was set up plumb and driven for about two feet. The leads were raised and a beveled block placed under the high side. The pile line was then taken around a pile in row "A," left high for this purpose, then around the bottom of the leads and hooked on the low side. The boom was then swung until the pile assumed the proper slope. The pile was then blocked against the leads. The pile line in this position held the leads rigid and eliminated most of the sag caused by the weight of the hammer. By this means vertical and batter piles were driven alternately with no additional rigging and little lost time.

P. R. Eldridge, General Superintendent, was in charge for the Pierce Steel Pile Corporation with the writer as job superintendent.

Among other noteworthy jobs recently completed by Pierce Steel Pile Corporation are included pile driving for the West Side Express Highway, U. S. Assay Office, and the U. S. Post Office and Parcel Building in New York City.

FIELD NOTES

Keep Blasting Caps Away from Children

FIGURES available for the year 1931 show a decrease of ten per cent in the number of blasting cap accidents to children, as compared with the preceding year. It is hoped that an even greater reduction can be made this year. *The Institute of Makers of Explosives* is now making another appeal to all those who use blasting caps to see that they do not fall into the hands of children. At this time of the year these accidents tend to show an increase due to the fact that children play more out of doors. The campaign to warn children of the danger of playing with blasting caps, and adults of the danger of leaving the caps where children might find them, was started five years ago. It has been participated in by trade papers, newspapers, press associations, Boy Scouts, Girl Scouts, school authorities and many other organizations.

Utility of Cane Sugar in Mortar

IN A PAPER, presented before the Sugar Division of the American Chemical Society at its meeting in New Orleans, March 29, 1932, Drs. Gerald J. Cox and John Metschl, of Mellon Institute of Industrial Research, Pittsburgh, have discussed their current investigations of the value of cane sugar in strengthening lime-sand mortar. Such an application of sugar is not new, as it is believed that the Romans made use of saccharine materials in mortars that have certainly stood the test of time. Also, in sugar-growing countries, sugar has been employed to increase the strength of mortar.

Drs. Cox and Metschl have found that there is very good reason for "sweetening" mortar. From their experiments they have ascertained that mortar which contains sugar equal to 6% of the quicklime content has a tensile strength 60% greater than that of mortar containing no sugar. Further tests are planned of compression strength, setting time and durability as influenced by cane sugar.

The process of mixing the sugar with the mortar is quite simple. The sugar is dissolved in part of the gaging water and mixed in with the sand and lime. The sugar must not be mixed with the lime before slaking.

With the present low price of sugar, the 5 or 6 pounds of sugar necessary for 100 pounds of lime is only a small addition to the cost of laying bricks or plastering a wall.

A number of different interpretations have been given the announcement of these investigations, causing the Portland Cement Association to issue a later announcement. Mr. Cox specifically states, "The description of our work and our recommendations apply only to lime-sand mortar. Our search of the literature has revealed that about 70 reports on the effect of the addition of sugar to portland cement. The authors are unanimous in their findings that cane sugar ruins concrete made from portland cement and must not be used."

Delaware Court Rules on Local Labor Preferential Clause

"THE SUBCONTRACTORS on the job, as well as the men they employ must be bona-fide residents of Delaware unless proof is presented to the Board of Public Education in Wilmington that it is impossible to secure the class of work called for from any Delaware concern," read the bidding specifications on a Wilmington school-building job.

"That clause violates the provisions of the United States Constitution that guarantees to every citizen of each state all the privileges and immunities of citizens in the other states," *complained* plaintiff in a case lately decided by the Delaware Court of Chancery (156 Atl. 286).

But the court said that, under decisions of the highest court of the land, such provisions for the employment of home folks on public works are valid, whether prescribed by statute or voluntarily inserted by the governing board of a municipality, etc.

—*A. L. H. Street, Attorney-at-Law.*

Trench Method of Fill Settlement

A DESCRIPTION of the trench methods of accelerating fill settlement with explosives, illustrated with photographs and diagrams, is a feature of *The Explosives Engineer* for April. The article is written by W. J. Keese, of Duluth, Minnesota, an explosives engineer of the Hercules Powder Company.

The general principle involved in accelerating fill settlement by explosives is to blast away the muck or unstable material between fill and hard bottom, allowing the fill to settle quickly to firm foundation.

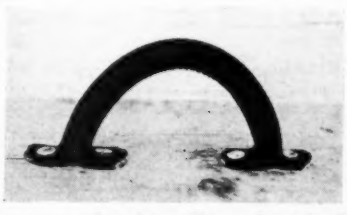
The trench method as described in the article is used in constructing fills across marshy areas where the depth to solid bottom does not exceed thirty feet. The method has been successfully used in the Northwest where peat is the underlying material, covered by a heavy surface material of vegetation.

The economy of quick settlement of fill by the use of explosives has been recognized by highway engineers in all parts of the country, as the system eliminates delays, costly detours, dips and breaks in the road, and gives a stable highway across swamps in minimum time.

Reprints of the article by Mr. Keese may be obtained free from the Wilmington, Delaware, office of the Hercules Powder Company.

Made Good Handle in a Pinch

HANDLES are often needed around the job when there is but mighty little chance of getting anything which looks like one. A good many things are nailed or tacked on to afford one. The photo here shows one quickly and easily made of a piece of hose, for the cover of a feed water barrel.



The ends of the hose were simply split and tacked down in a few minutes. Not strong enough to lift a house, of course, but quite satisfactory for the purpose made for.

Frank W. Bentley, Jr.

THE EXCAVATING ENGINEER
FOUNDED 1905

A Monthly Publication Devoted to Excavating and Allied Subjects

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THE EXCAVATING ENGINEER PUBLISHING CO.
F. O. Wyse, Managing Editor—Arnold Andrews, Editor
E. M. Heuston, Advertising Manager.
South Milwaukee, Wisconsin
Printed in U. S. A.

The Business Situation

DURING the past few weeks, the most interesting development in the business world has been the easing of credit, the laying of the foundation for an expansion of credit from the present shrunken volume.

Too many of us are prone to think of money as a commodity; too many of us look upon money we use in every day business as an indication that so much gold is ours and is deposited for us in the United States Mint. We are inclined to overlook the fact that practically all our business of today is transacted by the use of credit and not by the exchange of money. Money is used only for the very smallest of transactions; it is credit that plays by far the most important part in our business dealings. Some nine-tenths of the volume of the business done in this country is done by credit and not by the exchange of money itself.

Sixty years ago our volume of credit amounted to $50.00 per capita; today, after having risen to more than $500.00 in 1929, it amounts to somewhat less than $371.00 per capita. Since last September, this shrinkage of credit has been one of the serious factors in the present period of business inactivity. In the past few months several proposals have been brought forward in Washington for the production of fiat money to relieve the credit stringency which has threatened our monetary system. We are fortunate that all of these were killed and that a much wiser plan was adopted. This plan has as its basis, not the increase in the volume of actual money, but the increase in the volume of credit derived from the actual money in the ratio of approximately nine to one.

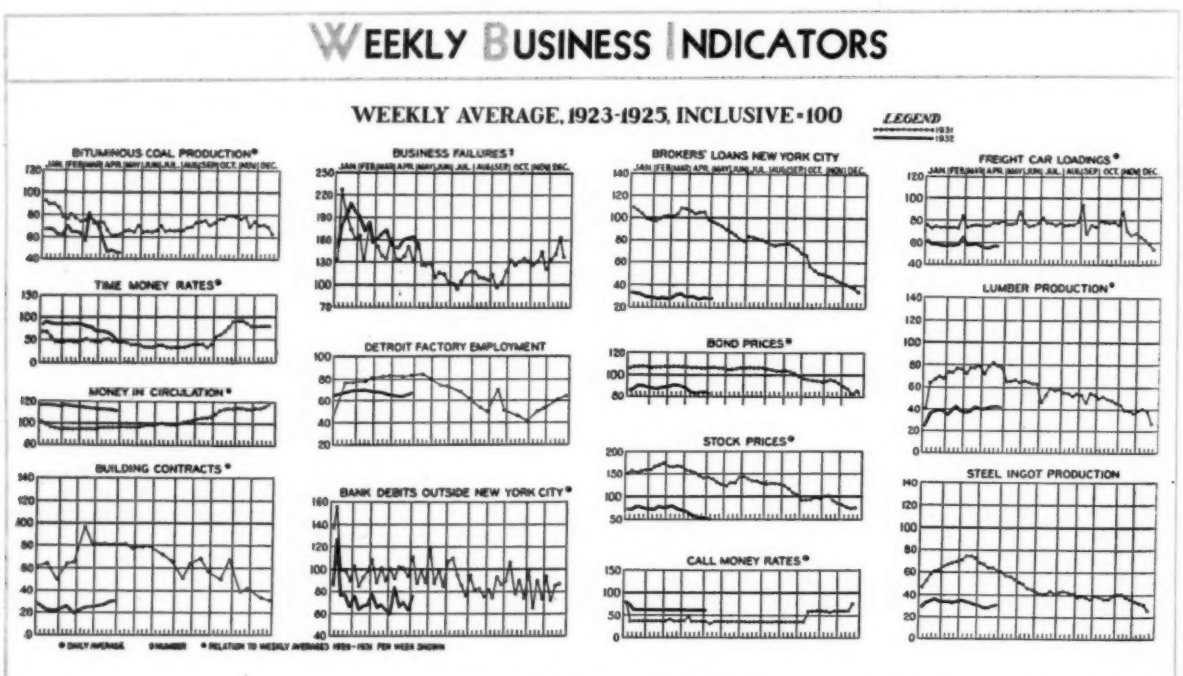
The Federal Reserve Banks have been purchasing government securities more extensively than they did in 1930 and 1931. This purchase of government securities by the Federal Reserve Banks creates additional capital by placing the Federal Reserve obligations in the hands of the country's banks, enabling them in turn to reduce their indebtedness to the Reserve Banks. As the member bank indebtedness is reduced, further credit is made available by those banks for the use of the country's business men. It does not pay a bank to hold idle money on hand; a liberal supply of member bank credit, therefore, promptly increases the supply of credit available for needs of business.

The availability of credit brought about by this action of the Federal Reserve Banks has produced another important result—that of creating better sentiment among business men in general.

The Reconstruction Finance Corporation has also done its part by the dissipation of fear concerning banks. A great majority of the loans made by the corporation have been in small amounts and have been made to banks in towns of less than 25,000 population. This has brought about relief in the small country bank where the need was, perhaps, the most serious from a psychological point of view.

It is also interesting to note that the figures for

WEEKLY BUSINESS INDICATORS



money in circulation show that hoarded currency is continuing to be brought out of its hiding place and put into circulation.

These various factors have brought about a consistent easing of credit which should materially help the acceleration of business activity.

F. W. Dodge Corporation reports that of the thirteen districts comprising the thirty-seven states east of the Rockies all but three showed higher construction contract totals in April than in March. April contract totals for the entire eastern area showed an eight per cent gain over March in contrast with a loss of nine per cent between the corresponding two months of 1931. But only slight encouragement is offered by the current pick-up since analysis discloses that the gain was entirely due to public works, especially highways.

Metropolitan New York, Southern Michigan, and the Chicago territory were the exceptions which did not partake in the April advance over March this year. The April total for the entire thirty-seven states east of the Rockies was $121,704,800. Residential building formed $28,894,700 of this total; non-residential building formed $45,515,000; and public works and utilities amounted to $47,295,100.

Residential building gains over March of this year were shown in the New England, Chicago, Central Northwest, Southern Michigan, St. Louis, Kansas City, and New Orleans districts. In the case of non-residential building, gains over March were shown only in the New England, Metropolitan New York, Upstate New York, Middle Atlantic, and St. Louis territories.

In public works the April gain over March amounted to ninety-three percent according to the monthly statistical bulletin published by *F. W. Dodge Corporation;* while a year ago a loss of fourteen percent was shown between March and April. For residential building the April contract record showed a loss of almost thirteen per cent from March, and for non-residential building April contracts were almost eight percent smaller than the March awards.

Do You Know This Contractor?

MR. AVERAGE EXCAVATING CONTRACTOR of the States of Massachusetts, Connecticut and Rhode Island owns 2.6 shovels-draglines-cranes, according to a field survey made recently. He uses 37,867 gallons of gasoline and has annual lubricating oil requirements amounting to 1,062 gallons.

Four out of five contractors who replied to the questionnaire haul with trucks, though some of these also use other methods of hauling. 77% of the contractors who haul with trucks own their own trucks; the remaining 23% rent or sub-contract trucking. The average dump truck fleet among all contractors hauling with trucks is 7.2. The average fleet for contractor-owners is 5.5.

Every hundred contractor-readers in these three New England states also own:

228	Air Compressors	101	Cars, Dump
39	Batchers	56	Conveyors
77	Bins	73	Crushers
98	Buckets, Clamshell	27	Ditchers
28	Buckets, Dragline	525	Drills, blast hole
58	Bulldozers	389	Drills, jackhammer
10	Graders, elevating	29	Piledrivers
47	Graders, power operated	384	Pumps
26	Graders, tractor drawn	148	Rollers, road
106	Hoists	62	Scrapers, tractor drawn
5,879	Lanterns, kerosene	10,441	shovels, hand
148	Lights, acetylene	1,211	Torches, kerosene
8	Lighting plants, electric	95	Tractors
		37	Trailers, heavy duty
20	Loaders, excavating	79	Welding outfits
9	Locomotives, gasoline	35	Wagons, dump, tractor drawn
7	Locomotives, steam		
224	Mixers, Concrete	10	Wagons, dump, tractor mounted
28	Pavers		

The statistics given above are based on answers received from 17.4% of the 616 contractor-readers to whom the questionnaire was sent. This return may be considered excellent as "group pictures" are usually based on approximately 10% returns. Incidentally the 107 contractor-readers stated that the number of readers per copy is 3.77.

In *January* of this year there was presented Mr. Average Excavating Contractor of Missouri, Kansas, Iowa and Nebraska. Early issues will contain information on contractors in other groups of states.

Two Yard Dragline Averages 2,093 cubic yards per Eight Hour Shift for Entire Month to Set Record

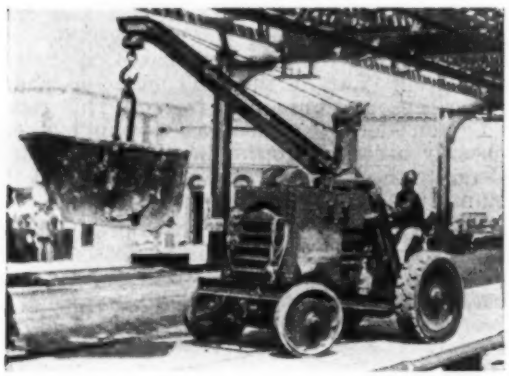
THE BEST record for excavation ever made on the Middle Rio Grande Conservancy District's $10,000,000 flood control, drainage and irrigation project, which started two years ago, was made during the month of March with a 50-B Bucyrus-Erie machine.

This machine, with W. W. Snyder as operator and Ed Odle as oiler, averaged 2,093 cubic yards per eight-hour shift for the entire month. It worked a total of 25 shifts and was employed on the Alameda interior drainage ditch. There was about ten hours' time charged against operation that the machine was shut down on account of moving telephone lines and fences. There was no time lost due to mechanical trouble, although this particular machine has been in service almost two years. It is powered with an Atlas Imperial Diesel motor and equipped with a two-yard Page bucket.

The Conservancy District has six 50-B Bucyrus-Erie and ten P & H draglines in service.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

Improved Loadmaster Crane Unit Now Offered With Choice of Power



ANNOUNCEMENT has just been made that the Loadmaster manufactured by *Bucyrus-Erie Company* will now be available with either Case or McCormick-Deering power, and that the capacity of this versatile crane has been further increased to 4500 pounds.

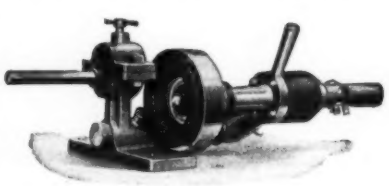
This Loadmaster with its increased capacity, has a wide variety of uses. It can be used as a stationary revolving-boom crane, as a crane traveling with its load, or as a tractor. Its extreme mobility, compact design, and the many items of special equipment available make it extremely handy for both indoor and outdoor work.

It lifts and swings or carries loads to points where needed. It will load and unload trucks and cars; sort and pile stored material; lift rock, pipe and transformers from and into manholes and trenches; serve machine tools; assist in overhauling and repair work. It is furnished with either wheel or crawler mounting. If you are interested in the Loadmaster write Bucyrus-Erie Company, Department L-30, South Milwaukee, Wisconsin.

Shank Grinder

A RECENT announcement of *Ingersoll-Rand Co.*, 11 Broadway, New York, brings word of the 4K Shank Grinder, a tool for facing the striking ends of drill steel shanks, rock drill and paving breaker pistons, and anvil blocks.

The machine consists of a "Multi-Vane" air grinder mounted in a frame so as to allow the grinding wheel to be passed back and forth by means of a handle. The grinder mounting is fitted with a wing nut adjustment working under spring tension for feeding the wheel up against the face being ground.

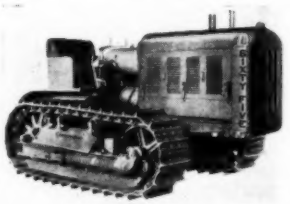


The steel or piston is held in a self-centering "V" block clamp incorporated in the frame. A countersinking bit is located in the center of the grinding wheel for removing the burr from the hole in hollow drill steel. The complete machine can be bolted securely to the top of a work bench or other suitable location.

The 4K grinder insures the uniform and correct dressing of striking faces and eliminates rounded drill steel shank ends and cupped pistons, which are responsible for much of the spalling and breaking of these parts. Its use results in better performance of drills and paving breakers and reduces maintenance and replacement costs.

New "Sixty-five" Caterpillar

THE NEW Caterpillar "Sixty-five" placed on the market March first by *Caterpillar Tractor Company, Peoria, Illinois,* is a step-up in size from the "Sixty" which established such a reputation on logging, levee building, road building, and construction work and completes the new line of Caterpillar tractors.



The specifications of this new unit include the following: drawbar horsepower (maximum in, second speed) 68 h. p.; belt horsepower (maximum) 79 h. p.; length over-all, 159⅛ inches; height over-all, 87-7/16 inches; width over-all, 101 inches; engine, 7x8½, four-cylinder, four-cycle, water-cooled; piston displacement, 1308 cubic inches; force-feed lubrication. Additional information may be had by writing Caterpillar Tractor Company.

New Bronze Welding Rod

A NEW bronze welding rod, Oxweld No. 25M. Bronze Patented Welding Rod, has been introduced by *The Linde Air Products Company, 30 East 42nd Street, New York, N. Y.* Because of its special characteristics this manganese bronze rod is unexcelled for use in the rebuilding of wear-resisting surfaces such as piston rings or cylinder walls. Besides producing weld metal with superior wear-resisting qualities, this rod has the added advantage of being non-fuming and exceptionally free-flowing. One of the outstanding features is the hardness of the resulting weld. Welds made with it have consistently shown a hardness of 96 Brinell. This is a very important consideration when building-up wearing surfaces such as bushings or other abrasion areas.

It is possible to remelt and reweld welds made with this welding rod with an ease heretofore considered impossible with a bronze welding rod. This rod is particularly effective for use in the sectional building-up of large pieces, where the weld must be made in successive layers, because there is no heavy slag formed over the weld after it has cooled.

New Wear Resisting Taylor Chain

FOR MORE than three years the engineering department of the *S. G. Taylor Chain Company, Hammond, Indiana,* has experimented with various metals and their treatment in order to produce a better wear-resisting chain.

This research has resulted in the recent announcement of the new "Taylor Made Special Wear Resisting Drag Line Chain". This chain has a much longer life than the ordinary chains used on draglines in the past. In addition to the wear resisting qualities of the new chain, it also has unusual strength to stand up under the job.

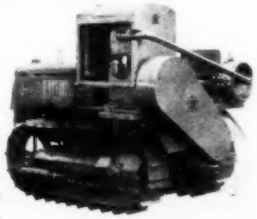
"In our fifty-nine years in the chain business, it has always been our policy to introduce a new product only after it has been thoroughly tested and proved," said Mr. E. W. Taylor. "We announce the new Wear Resisting Drag Line Chain with a full knowledge of its worth. Exhaustive tests and research over a period of three years have shown us beyond any doubt that this chain will do more efficiently and more economically the job for which it is designed."

Further information will gladly be sent on request. Please mention *The Excavating Engineer* when writing.

New Compressor Mounted on Tractor

A LINE of air compressors mounted on the frame of any standard make tractor and driven from the power take-off by the latest type "V" belt pulley has been announced by *Schramm, Inc., West Chester, Pa.*

These compressors are furnished in three sizes, 72, 120 and 180 cubic feet displacement; are mounted alongside the driver's seat on a separate sliding frame which can be removed with little effort.



The standard Schramm features are built in this new mounted-on type compressor; automatic slow-down control is connected with tractor engine which controls the engine speed to meet air requirement; compressor is protected from weather by a steel housing and equipped with removable sliding doors that may be padlocked; "V" belts and pulleys are likewise protected by a complete enclosure; air tank is standard A. S. M. E. approved, hot riveted type; water cooling from a heavy-duty radiator reduces and eliminates overheating of compressor.

The compressor mounting does not alter or affect the pulling or towing feature of the tractor drawbar. Further information will gladly be sent by the manufacturer.

Manganese Steel Electrodes

TWO GRADES of manganese steel electrodes have been placed on the market by *Stulz-Sickles Company, 134 Lafayette Street, Newark, New Jersey,* under the names of Seaco Manganal 11 to 13½% Manganese Steel Electrode and Seaco No. 151 Manganese Alloy Tite Kote Electrode.

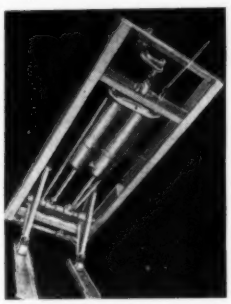
These new electrodes, claim the producer, will do a better job of reclaiming manganese steel equipment such as dipper teeth, buckets, crusher mantles, plates and jaws, liners, pump shell liners, pump shell impellor blades, sprockets, sheaves, etc., and at a small fraction of the cost of new parts.

Both electrodes are suitable for the armoring of soft steel and high carbon steel parts. For further information write Stulz-Sickles Co., mentioning *Excavating Engineer.*

New Hydraulic Body Hoist

A NEW hydraulic hoist with high angle lift and quick action; a complete, self-contained, compact unit has been announced by *Fitz Gibbon & Crisp, Inc., Trenton, N. J.*

Improved design applies abundance of power without subjecting either chassis or hoist to undue strain. The load is evenly distributed over a large chassis area. Maximum hydraulic pressures are low. Valves in cylinder head, and other novel features, contribute to trouble-free operation. Performance guaranteed for two years.

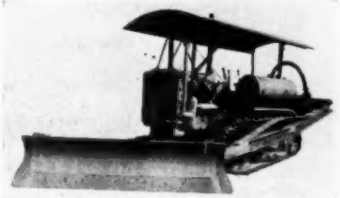


The hoist is built in two single cylinder and two twin cylinder models to cover all load and dumping conditions. All models are complete units, including: cylinders, pump, lifting arms, hinges, pump-drive, power take-off with control, clamps and wood sills. Mounting requires no drilling of holes nor other fitting, it being merely necessary to clamp the hoist unit on the chassis. When writing the manufacturer for further information, please mention *Excavating Engineer.*

LaPlant-Choate Road Builder

FOR DIGGING on uneven ground, rocks, clay, decomposed granite and any materials found in mountainous regions, LaPlant-Choate has developed the new Road Builder shown here.

It is also designed with a 36-inch lift with a special moldboard, having heat-treated cutting bits at each end of the blade for cutting in the side of the mountain or hill. The moldboard is designed to roll the earth forward and to one side. The blade can be set at a 30-degree angle so that a certain portion of the dirt is carried forward to balance the grade while the unnecessary portion is spilled to the side. In this way, the blade performs the function of both bulldozer and backfiller when set at an angle. For complete details and specifications write *LaPlant-Choate, Cedar Rapids, Iowa.*

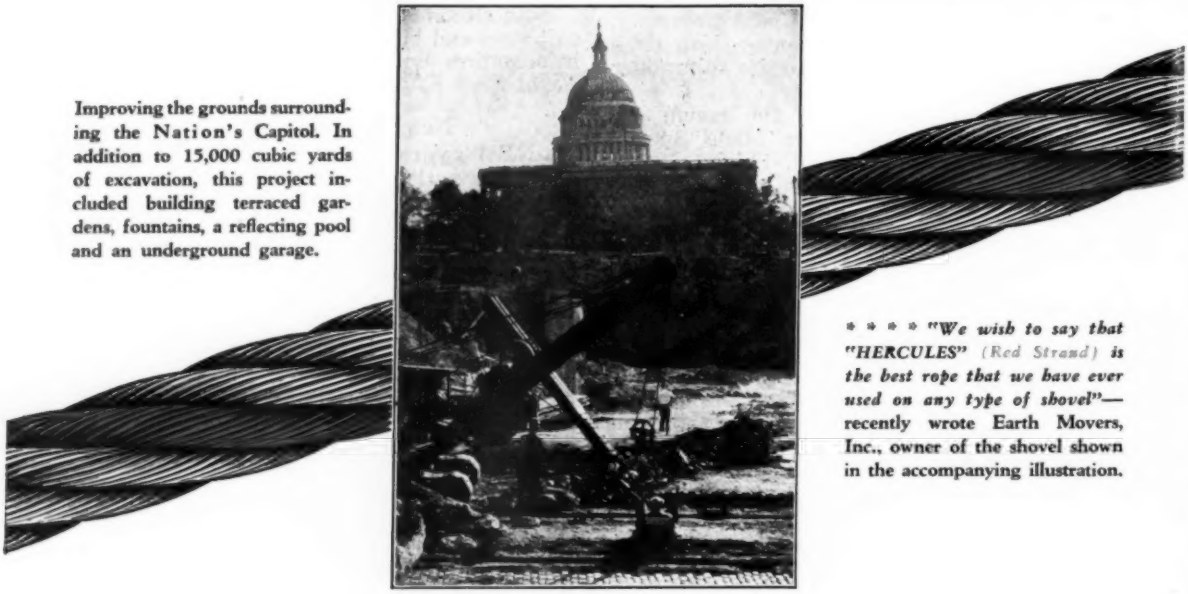


STAR PERFORMER

I've had my day on the Gay White Way,
And one-horse towns have seen my show;
When I perform, the people swarm
In droves to watch—it's S. R. O.
If I charged a cent for every gent
Who's seen my stuff, through my career,
I could have bought a Morgan yacht:
I'm an excavating engineer!

— Charles Doubleyou

Improving the grounds surrounding the Nation's Capitol. In addition to 15,000 cubic yards of excavation, this project included building terraced gardens, fountains, a reflecting pool and an underground garage.



* * * * *"We wish to say that "HERCULES" (Red Strand) is the best rope that we have ever used on any type of shovel"*— recently wrote Earth Movers, Inc., owner of the shovel shown in the accompanying illustration.

Of Course You Are Interested In Saving Money—

. . . Then why not get first hand information on "why" and "how" "HERCULES" (Red Strand) Wire Rope can help cut down your operating cost?

The money saving ability of this wire rope is in what it can do. Its long life not only keeps its cost "per unit of work" very low, but it also makes replacements less frequent.

There are definite reasons why "HERCULES" is so dependable and long lasting. In the first place, it is a product of long experience, and in its manufacture nothing is left to chance. Rigid tests and careful inspection insure that our exacting standards are constantly maintained.

No one design of wire rope is suitable for all purposes. Consequently "HERCULES" (Red Strand) Wire Rope is furnished in a wide range of constructions, including both Round Strand and Patent Flattened Strand types.

After all, results are what count, and it is on the basis of performance that "HERCULES" Wire Rope continues to make and hold friends. Why not give it a chance to show you what it can do? Do not hesitate to try it on your hardest work.

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Made Only by **A. LESCHEN & SONS ROPE CO.** Established 1857

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SHOTS FROM THE FIRING LINE

Excavating for 1932 Highway Construction—A Forecast

EACH January for the past few years we have had the pleasure of presenting a complete Forecast of Highway Construction for the several states of our Union. Supplementary forecasts are published through the year — those below are based on late reports on Vermont and Virginia highway building plans.

Vermont

During the 1932 season Vermont expects to grade and surface 152 miles of new roads at an expenditure of $2,600,000. This includes 83 miles of Federal Aid roads at an expenditure of $1,530,000, 39 miles of state roads at an expenditure of $800,000 and 30 miles of county and local roads at an expenditure of $270,000. In addition the Vermont Department of Highways expects to reconstruct 20 miles of state highway at an expenditure of $10,000. About 75% of the excavation required is considered suitable for shovel operation. Vermont paving will probably total 39 miles at a cost of $1,400,000 and it is also expected to surface with gravel or crushed stone 113 miles at a cost of $1,200,000. The work as outlined above represents a decrease of 20% of the 1931 program.

Virginia

Highway construction in Virginia for 1932 will probably involve expenditure of $1,992,380 on the Federal Aid System and $9,807,619 on State roads. This is approximately the same as the 1931 expenditure.

Cities Maintain Paving Programs to Furnish Jobs

ALTHOUGH cities are operating on reduced budgets, many are proceeding with normal programs of public improvements, a survey shows. These cities have determined that the need for jobs and the current low construction prices, which enable them to obtain upwards of one-fourth more for their money, warrant continuance of such activities as street and sewer construction.

Street construction, particularly, is being used as a means of keeping men at work. Cincinnati, with the largest 1932 street program, is spending more than five million dollars for that purpose, in addition to two million dollars for sewers. Cincinnati is concreting some nineteen main thoroughfares and sections of 53 minor streets. Among other cities throughout the country stressing paving programs are Jersey City, Albany, Seattle, Macomb, Illinois, and Chattanooga, Tennessee.

Fortieth Anniversary of the Oldest Concrete Pavement in the United States

IN 1892, before there were any automobiles, Bellefontaine, Ohio, installed strips of concrete on Opera and Court Streets on two sides of the courthouse. Streets on the two remaining sides of the courthouse were paved the following year.

This old pavement is still giving excellent service. Upkeep of the streets have cost only $300 during the past forty years, according to Frank Mitchell, city engineer.

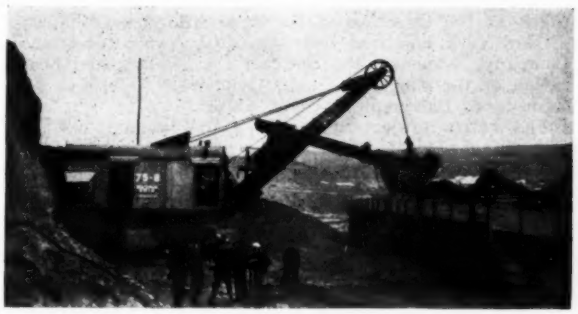
The application of concrete as a street paving material came about by accident, reports W. T. G. Snyder, who as a sidewalk contractor was called upon to build the first concrete pavement. City officials had experienced difficulty in obtaining a satisfactory pavement for the hitching rack areas around the courthouse because the large Percheron horses driven to town by the farmers made short work of the materials then available. Upon learning that Mr. Snyder had installed a successful concrete surface for a crossing driveway for a lumber company, the city asked him to concrete the streets.

Bellefontaine continued to pave streets with concrete and its use spread rapidly throughout the country. Today, according to the Portland Cement Association, there are 24,000 miles, on the basis of a 30-foot width, in the United States. In addition there are in excess of 90,000 miles of concrete rural roads.

Algeria Notes

By D. H. MARLOW

Dam construction in Algeria is largely carried out by Bucyrus-Erie 50-B electric shovels. This machine is loading out the rock in the quarry of **Messrs. Campenon Bernard,** the well-known French contractors, on their Oued Fodda Dam contract. The Ward Leonard control is particularly appreciated in this heavy rock service. Mr. Safond, chief engineer in charge of the works, has had considerable experience with Bucyrus-Erie 50-B and 41-B machines in France.



This Bucyrus-Erie 75-B Ward Leonard shovel is doing good work for **Messrs. Entreprises Algeriennes Chagnaud Fils,** on their Bou-Hanifia Dam contract, Algeria. Machine is shown excavating the spill-over canal, in a tough rubber-like African clay. The cars are 6-cubic meter standard gauge, the cut about 15 feet deep by 25 feet wide. Digging the dam foundations are two Bucyrus-Erie 50-B Ward Leonards. On their Ghrib contract, another Algerian dam construction job, Messrs. Chagnaud have two 50-B and a D-2 Bucyrus-Erie shovels, and one Ruston-Bucyrus Ward Leonard 52-B machine. In full charge of all Messrs. Chagnaud's African contracts, is Monsieur Cochard, whose office is located at Algiers.

Montreal and Vicinity

By S. A. STEPHENS, JR.

Constructional activity is showing slight signs of increase with the advent of summer. Several large contracts are under way for the City of Montreal's $4,800,000 Relief Program. Most of the jobs are subways under railroad tracks and all excavating is done by hand labor.

The City Council's "beau geste" of hand labor for relief evidently failed to appeal to the voters, who threw the old Council out in the Municipal Elections of April 4th.

Many interesting ways of getting around the hand labor clause are to be seen around the various jobs. **The Local Construction Company** uses air spades for digging and load into skips which are hoisted by cranes to waiting dump trucks.

The National Quarries Limited have transferred their 100-B Electric from Innerkip, Ontario, to their quarry at Cote St. Michel, near Montreal.

The Kennedy Construction Co., Ltd., has been awarded contract for concrete highway joining the new Laprairie Highway with the Canadian National's Victoria Bridge. The contract amounts to $164,495.00 and will start in the near future.

The late spring held up certain types of construction due to the slowness of the frost in leaving the ground.

Baltimore and Vicinity

By FORD FISHER

The Arundel Corporation, of Baltimore, and **M. Sullivan Dredging Company**, of Detroit, were low bidders recently on a $3,500,000 contract for dredging the Livingston Channel at Detroit.

Continental Contracting Company was low bidder on 8.38 miles of concrete shoulder work for the Maryland Roads Commission. This company owns a Bucyrus-Erie GA-2 machine which will most likely be used on this project.

Development and Construction Company, of Baltimore, have contracts with the Maryland State Roads Commission covering 6½ miles of concrete shoulders and roadway. Their Type B Bucyrus-Erie machine will be kept busy on this work.

Leo J. McCourt, of Baltimore, is keeping his Gas+Air machine busy doing special digging work around Baltimore. This machine has been handling rock and other hard digging and its splendid performance has brought out real praise from the owner.

Buffalo and Vicinity

By D. E. WHITE

Contracts have been awarded for work in connection with the elimination of 21 grade crossings on the line of the Delaware, Lackawanna & Western in Elmira. The project, to commence immediately, involves the construction of passes under the four main tracks of the Lackawanna at Madison Avenue, Lake Street, Dickinson Street, East Washington Avenue, East Fifth Street, Oak Street, East Avenue, East Clinton Street, Sullivan Street, East Church Street and John Street. The grade of the D. L. & W. line alongside its Elmira passenger station will be elevated 10 feet above the present level of the station floor.

The general contract for the work, which is being undertaken at the direction of the Public Service Commission of New York, has been awarded to the **Walsh Construction Company**, Syracuse; the contract for grading and preparation of the subgrade for the temporary tracks required went to **E. Dalrymple & Sons**, Elmira.

The entire project will involve the handling of some 480,000 cubic yards of earth; the use of 25,000 barrels of cement; 14,000 cubic yards of concrete, and other items.

By M. E. FRANKLIN

Six bids for the construction of a second grain elevator, to have a capacity of 2,500,000 bushels, were opened recently at the Port Commission's office, Port of Albany. **The James Stewart Corporation**, now engaged in constructing a 13,000,000 bushel elevator at this Port, was the low bidder at $689,690.00. Other bidders were The Lehigh Pile & Foundation Corporation, Monarch Engineering Company, Folwell Engineering Corporation, McDonald-Spencer Engineering Company and the Rust Engineering Company.

Peter G. Ten Eyck, Port Commission Chairman, stated that approximately three weeks would elapse before a decision was made, to allow for comparison and study of the bids.

Pittsburgh and Vicinity

By J. S. WEAVER

Contract has been awarded to **John Carson & Sons Company** for the construction of the road and part of the sewer and water lines in connection with the new Epworth Fresh Air Farm project along the Perry Highway. Bucyrus-Erie equipment will be used on the work.

The Borough of Kittanning received bids and awarded the contract to the **Walsh Construction Company**, Pittsburgh, for the construction of a 24-inch sewer in the borough.

More progress has been made in the past few weeks with the **Pittsburgh Subway** than has been accomplished in several years. The Council, seemingly ready to authorize the work, is anxious to bring the matter to a head, with Works Director Edward G. Lang submitting an estimate of $5,510,500 as the cost of building an underground tube 8,000 feet long. The report has been referred to the Committee on Public Works.

Work on the new **Montgomery Island Dam** below Beaver is expected to be started in the very near future by **Booth & Flinn Company**, whose bid was the lowest of 19 opened at the U. S. Engineer's office here some few days ago.

The proposed roller-type dam will be the only one of its kind on the local waterways. It consists mainly of a series of 16 huge cylinders stretched across the river in place of the usual wickets. The new dam will replace dams 4, 5 and 6, and will have two locks.

Work has been started on the construction of the new **Mt. Washington roadway extension** from the Liberty Tunnels to South Tenth Street. The city is completing the project as its contribution towards unemployment relief, according to Public Works Engineer Charles M. Reppert, and is estimated to cost $900,000. Between 400 and 500 men will be given employment for several months. The bridges and spans will be constructed by contractors according to Public Works Director Edward G. Lang.

Assurance that the city is not contemplating entering the contracting business to put unemployed men to work was given a group of representatives of contracting firms who called on Council President John S. Herron and Councilman W. Y. English, chairman of council's finance committee. Herron and English assured them that the Mt. Washington roadway work was taken into the city's own hands simply because it offered a convenient opportunity to give work to a large number of unemployed men. The work done by common labor hired by the city amounts to only $200,000 of the $900,000 to be expended on the job.

A. Ancarani & Sons, Clairton, have been awarded the contract for grading and paving the approaches to Boston Bridge No. 6 by the Allegheny County Commissioners. Work will be started at once.

Frank Kukurin, Wilmerding, was low bidder on the Evergreen road project for Allegheny County. Work will be started at once.

George N. & O. J. Yoho, Cameron, West Virginia, have completed their contract in Monongahela County, West Virginia, and are moving their outfit to Jefferson County (near Charles Town) West Virginia. The accompanying illustration taken on the Monongahela County job, shows the 43-B loading to Athey 3-way dump and International truck.

Ohio Notes

The Department of Highways of Ohio opened bids on May 20 and 21 for nearly two million dollars worth of highway and bridge projects.

Indiana Notes

Rosenberger Bros., of 351 Locust Street, Valparaiso, are looking for a hauling subcontract or rental contract covering their fleet of trucks. They would like to hear from any contractors having any kind of truck work to offer.

The State Highway Commission road letting May 17th brings the total mileage under contract for construction this year to 525. Because of lower bids than anticipated by the department, the mileage of construction to be undertaken this year will be increased to 600 instead of 500 as originally estimated.

Nello L. Teer, of Durham, North Carolina, was awarded a State Highway contract for 12 miles of grading and structures in Lawrence County for $87,767.76.

13 •THIS BIDDER'S LUCKY NUMBER

THE spongy muck soil of this old lake bed—the spiteful clawing of demon dust trying to bite into vital moving parts—the constant need to haul big and frequent loads—these things demanded "Caterpillar" Tractors for this job. Thirteen of them made the power equipment 100% "Caterpillar"—steadily discharging the contract's clauses—protecting and increasing the margin this successful bidder allowed himself. With all-soil traction to balance generous, rugged power—and bulwarked by the stamina of heat-toughened steels—"Caterpillar" track-type Tractors give what the contractor needs to make the profit goal!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.
Track-type Tractors Combines Road Machinery
(There's a "Caterpillar" Dealer Near You)

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Prices—f. o. b. Peoria, Illinois

FIFTEEN	$1100	THIRTY-FIVE	$2400
TWENTY	$1450	FIFTY	$3675
TWENTY-FIVE	$1900	SIXTY-FIVE	$4350
DIESEL	$6500		

•

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Shots From the Firing Line— *Continued*

Illinois Notes

Effective May 2, 1932, the general offices of the **Truax-Traer Coal Company** were moved to Suite 805, First National-Soo Line Building, Minneapolis, Minnesota, to which address all office correspondence should be directed. A Chicago office will be maintained in Suite 1503, Bell Building, 307 North Michigan Avenue.

Berenz & Son, of Bloomington, with a bid of $6,467.97, were awarded the contract for grading 6.72 miles in McLean County.

Cephas Williams, of Streator, with a bid of $17,553.36, was awarded the contract for grading 13 miles of Sections 8 and 9 in Woodford County.

The grading of 4.6 miles on State Aid Route No. 14 in Cass County on Section 3A was awarded to **Peter Simons,** of Quincy, on a bid of $11,281.

THOMAS SHEAHAN

Thomas Sheahan, 68, of the Sheahan Brothers contracting firm, died May 11th in St. Elizabeth hospital at Danville after a five-day illness. A widow and four children survive Mr. Sheahan.

The R. C. Huffman Construction Company, of Cleveland, Ohio, has opened an office at Morris, Illinois, in the Collins Building. This firm has contracts for 24.4 miles of dredging in the Illinois river between Marseilles and Dresden Heights, involving the removal of 1,928,000 cubic yards of earth and 233,000 yards of rock with 360 days in which to complete the work.

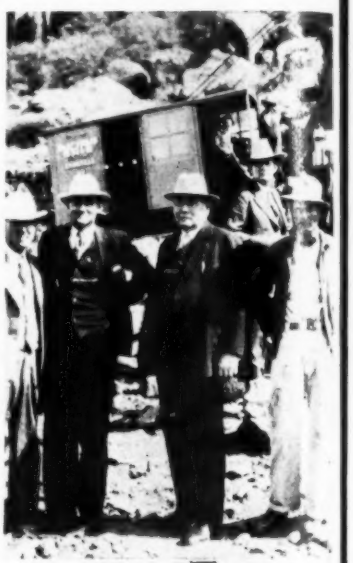
The Sternberg Company, of Piper City, Illinois, has been awarded drainage project in Lovejoy and Fountain Creek Drainage District to benefit 1,500 acres.

A number of grading sections are included in the **bidding to be held on June 15th** by the Illinois Department of Public Works and Buildings. There is 9.25 mile section in Henry County totaling 255,400 cubic yards; 6.20 mile section in Warren-Henderson Counties totaling 144,100 cubic yards; 2.47 mile section in Henderson County totaling 180,689 cubic yards; 3.71 mile section in Henderson County totaling 64,900 cubic yards; 2.15 mile section in Henderson County totaling 83,900 cubic yards, and a short 0.26 mile section in the same county totaling 22,000 cubic yards.

Dallas Notes

By G. A. CARLSON

Lone Star Construction Company recently commenced work on a State Park Road in the Davis Mountains. Governor Sterling and party came out to take part in the ceremonies at Fort Davis connected with starting the work. In the upper picture lined up in front of Operator Bingaman and the Lone Star Construction Company D-2 Diesel are (left to right): G. B. Finley, Division Engineer; Gib Gilchrist, State Highway Engineer; Governor Ross Sterling and Al B. Marshall, Engineer in charge of construction. Adjutant General Sterling is standing behind the governor. The road will be 75 miles long. Excepting for the shovel operations all of the work is being done directly by state highway forces.



The picture below shows the Diesel starting in on the grade and gives you some idea of the kind of digging it will find in this part of Texas.

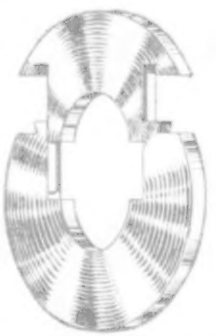
Harry Knickerbocker is Vice President-General Manager of Lone Star Construction Company. Their other Bucyrus-Erie equipment is on the State Highway job at Van Horn, Texas.

St. Louis and Vicinity

By A. J. KOENIG

Plans for a pedestrian underpass from the southeast to the northeast corner of Twelfth boulevard and Market street have been completed and bids for its construction will be asked soon. W. W. Horner, chief engineer, St. Louis.

The Samuel Kraus Company of St. Louis was low bidder for the foundation work of the proposed Federal building. The company's bid, $98,440, was the lowest of several excavating companies. The second low was $128,880 made by the Excavating & Foundation Co. of St. Louis. McDonald Contracting Co. also of St. Louis was third with a bid of $165,238.



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Recently much has been published regarding the service and economy of wire ropes.

For the guidance of rope buyers, therefore, Roebling desires to make the following statement, concerning the operating cost of its ropes, backed up by their performance in actual service over a period of many years:—

"Roebling does assert that when gauged by the work performed, NO wire rope, regardless of make or construction, will show lower general average operating costs than Roebling."

If you are not a user of Roebling Rope we invite you to try it—to see first hand evidence of its great stamina. We do not ask you to accept the service record of a single rope as conclusive proof of the general performance of Roebling Rope. Put Roebling Rope to the only reliable and most exacting rope service test:—judge it on the basis of its *average* cost per ton of material handled, per miles of travel, or other unit of service measurement.

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JOHN A. ROEBLING'S SONS COMPANY

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Shots From the Firing Line — *Continued*

Cameron-Joyce & Company was awarded contract for 6.4 miles of concrete paving in Sangamon and Christian counties on route 104, Illinois.

Henkel Construction Company, Mason City, Iowa was awarded contract for paving 13.34 miles on route 119 McClean and Champaign counties, Illinois.

Len Gray, St. Louis was low bidder on 0.29 miles of grading in Montgomery county, Illinois.

The U. S. Engineers office at St. Louis awarded contract for rebuilding and enlarging levee of Scott county, Illinois Levee and Drainage District on Illinois River; 510,000 cu. yds. to **Mulgrew & Sons Company,** Dubuque, Iowa, at $39,780 and 540,000 cu. yds. to **L. E. Sternberg,** Creston, Iowa at $74,088.

Massman & Peterman, St. Louis, were awarded contracts for 4,600 lin. ft. piling dikes in the Mississippi River at Devil's Island, Ill. and Kinney Point, Mo.

Lefferdink Construction Co., Springfield, Illinois was low bidder for grading 15.22 miles on route 104, Brown and Pike counties, Illinois.

Booth & Flinn Co., Pittsburgh, was low bidder for the Montgomery Locks in the Ohio River with a bid of $1,621,-593, alternate 'A' $1,553,793.

Tulley-Costello Co., Chicago, was low with a bid of $237,-771 for the completion of the unfinished work at Brandon Road Pool consisting of concrete masonry walls and sewers in Joliet.

Harrison Engineering Company, Kansas City, was low bidder for paving 13.856 miles with 20 ft. concrete slab on route 54, Cole county, Missouri. This company was also low on a bridge across the Little Niangua River in Camden county.

Brosnahan Bros., Kansas City, with a bid of $78,300 was low for paving 4.717 miles in Clinton county, Missouri.

Martin Wunderlich, Jefferson City, was awarded contract for 6.8 miles of grading on route 108 Macoupin county, Illinois.

Jos. Kesl & Sons, Edwardsville, Ill. were awarded contract for paving on route 150, Union County, Illinois. Their bid was $113,933.

Southern Notes

By R. S. WELFER

Chandler Brothers, Virgilina, Virginia, were awarded a heavy grading contract in Tennessee, a continuation of the project they completed last year in Sevier County.

Jehle Brothers, Montgomery, report a gratifying volume of business, although the projects are mostly smaller ones.

P. A. Goldsmith & Son, Montgomery, had the excavating on the new Post Office building.

Operators will be interested in knowing **J. O. Riles** is with the Marianna Lime Products Company at Marianna, Florida; **Ted Holly** is at Cottondale, and **C. Lee Johnson** is engaged in the used-equipment business at Panama City.

Colorado Notes

By H. M. BIBAUD

Plans for putting Pueblo, Salida, Gunnison and Grand Junction on the projected **George Washington bicentennial highway** were discussed March 17th with Governor Adams, by a group of eastern Colorado and western Kansas business men who wanted the Denver-Limon road paved. This the governor said the state could not afford unless an emergency highway appropriation bill was enacted by Congress. Under the plan discussed the bicentennial highway would enter Colorado from the east as highway No. 40, go north to Denver, thence to Pueblo, then to Salida and westward to San Francisco.

The Durango Chamber of Commerce headed a movement recently to secure federal funds for the construction of a **water impounding system** on the La Plata watershed in order that the ranchers may be able to irrigate their crops and will not be compelled to abandon their farms and homes.

"Marriage is a great institution," said Oscar Entwhistle philosophically, "no family should be without it."

Montana Notes

Bids will be received by the **Bureau of Reclamation,** Fairfield, Montana, until June 20, for furnishing labor and materials and performing all work for the construction of about 12 miles of open drains, and drainage structures incidental thereto, on the Greenfields Division, Sun River project, Montana. The work is located near Fairfield. The principal items involved are: 340,000 cubic yards of drain excavation; 400 cubic yards of excavation for structures; 12,000 cubic yards of backfill about structures; 115 cubic yards of concrete; placing 7,000 pounds of reinforcement bars; and laying 3176 linear feet of corrugated metal pipe. Materials to be furnished by the contractor, and those furnished by the Government are described in the specifications which will be a part of the contract. No charge for specifications and plans to prospective bona fide bidders; to others, 50 cents, not returnable. For particulars, address the Bureau of Reclamation, Fairfield, Montana; Denver, Colorado; or Washington, D. C.

Oregon Notes

Taylor Bros., subcontractors for excavation on the U. S. Veterans Hospital in Portland, combine a tractor-rotary-scraper and shovel operation to good advantage on the above operation. Their Byers shovel cast the dirt over into a spoil pile from which it was taken and spread by their Caterpillar 30 hauling an ordinary scraper.

Johnson Brothers Company, of Klamath Falls, with a bid of $60,318.00, was awarded the contract for grading 3.62 miles of the Trout Creek-Soda Fork Section of Santiam Highway.

Fisher Brothers, of Oregon City, on a bid of $30,723.40, were awarded the contract for grading 1.99 miles of the New Era-Canby Section of the Pacific Highway.

Washington Notes

Colonial Building Company, of Spokane, with a bid of $49,739.70, was awarded the contract for grading about 6.1 miles of Grand Coulee Highway, Soap Lake north in Grant County, involving about 124,190 cubic yards of excavation, 225 fineal feet of pipe culverts, and other items.

The contract for grading and surfacing about 3.6 miles of **Vashon Island Highway,** Center to Tahlequah, in King County, involving about 3.4 acres of clearing, 129,300 cubic yards of excavation, 7,660 cubic yards of crushed stone, 4,748 lineal feet of pipe culverts, and other items, was awarded to the **Erickson Paving Company,** of Seattle, with a bid of $37,138.30.

L. Coluccio & Company of Seattle were awarded with their bid of $46,593.04 the contract for grading and surfacing about 3.1 miles of State Road No. 9, Blyn East in Clallam County involving about 17 acres of clearing, 92,940 cubic yards of excavation, 13,120 cubic yards of crushed stone, 355 cubic yards of concrete, 1,281 lineal feet of pipe

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Shots From the Firing Line — *Continued*

culverts and other items. They were also awarded the contract for grading and surfacing about 3.6 miles of State Road No. 14, Port Orchard to Tidewater Creek, Federal Aid Project No. 168-C in Kitsap County involving about 24 acres of clearing, 121,640 cubic yards of excavation, 14,460 cubic yards of crushed stone, 265 cubic yards of concrete, 1,017 cubic yards of sack riprap, 1,830 lineal feet of pipe culverts and other items. The amount of this bid was $97,143.85.

J. S. Pederson, Enumclaw, was low bidder with $13,491.85 for grading about 1.8 miles of State Road No. 9, Marple Creek to Quilcene River in Jefferson County, involving about 31,500 cubic yards of excavation and other items.

Stenographer: "Your little girl wants to kiss you over the 'phone."

Busy Contractor: "Take the message. I'll get it from you later."

San Francisco and Vicinity

By H. L. LIVINGSTON

The voters of San Francisco having just passed a bond issue in the amount of $6,500,000.00, enough funds are now available to complete the construction of the Hetch Hetchy project for bringing water into San Francisco. Bids will be opened early in June for the remainder of the tunnels through the coast range mountains to complete this project.

The California Highway Commission has awarded to **Basich Brothers** of Torrence, a contract in the amount of $112,910.00 for surfacing 7.3 miles in San Mateo County from San Mateo to Redwood City.

$350,000.00 is available for **grading and paving seven miles of highway** in Contra Costa County from San Pablo to the Carquinez Bridge. Bids will probably be called for about June 15 by the California Highway Commission for this work.

Hemstreet & Bell of Marysville were low bidders to the California Highway Commission for 4.2 miles of grading in Butte County from Pulga to Cresta. The main part of this job is 465,000 yards of roadway excavation. The amount of their bid was $297,509.00. This aggressive organization is now handling at the present time several of the largest highway jobs in California.

Charles Harlowe, Jr. of Oakland is moving his equipment into Mariposa to handle the highway contract there that has just been received by him. L. C. Vernon will operate Mr. Harlowe's new Bucyrus-Erie 37-B gas shovel on the day shift and George Utley will pull the levers on the night shift.

The above illustration shows operations of **Thompson Bros.** on the Belmont Avenue subway in Fresno. This project, costing over $200,000, is being shared by the City of Fresno, County of Fresno, State of California, and the Southern Pacific Company. The new subway will break the rail bottleneck between the main rail yards in the city of Fresno and the S. P. Classification yards. The subway

Time lost in frequently replacing inferior friction blocks can now be put to work . . . for profit. Beco-Blocks will not only last longer but will provide more accurate control . . . smooth, sure starting . . . will not grab . . . quick to let go . . . no after catches.

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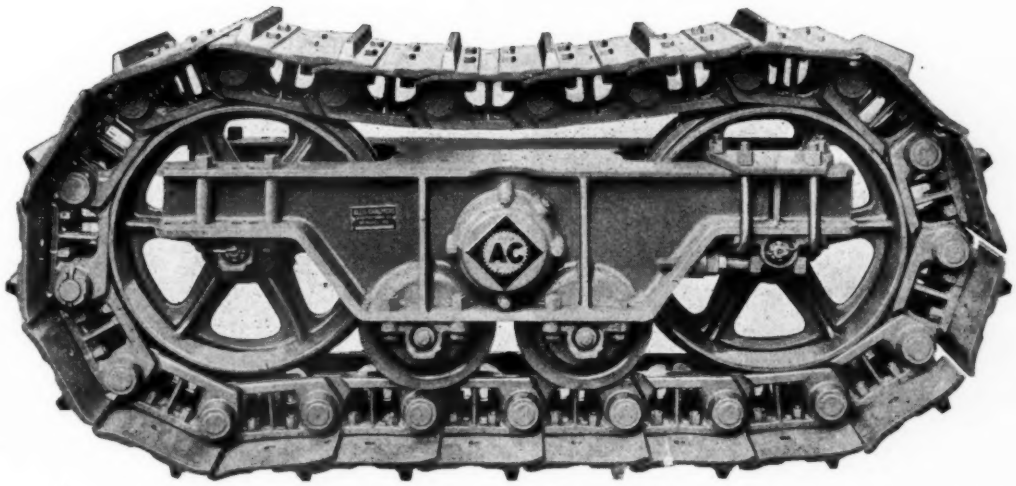

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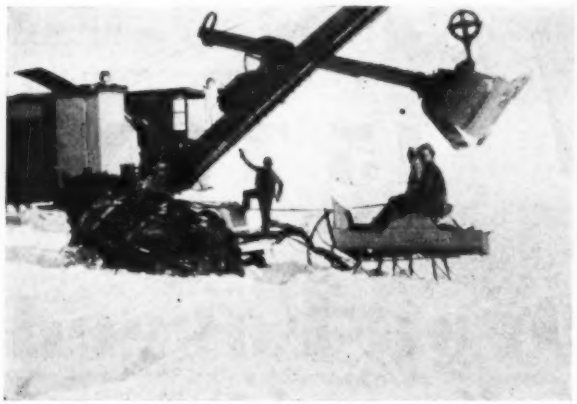
Shots From the Firing Line — *Continued*

requires excavation of over 22,000 cubic yards. Thompson Bros.' Gas+Air encountered some hard digging on this piece of excavation, judging by indications on the bank behind the shovel.

By J. H. SACKETT



We really should title the above picture "Believe It or Not" (with apologies to Mr. Ripley). Yes, this snapshot was really made in California. During this last winter some parts of California have had an exceptionally heavy snowfall and at one time the revived mining camp at Bodie was more or less isolated from the rest of the state due to the fact that the roads were made practically impassable by snowdrifts. **Treadwell-Yukon Company**, who have opened up an old mine at Bodie, and whose operations were described in the November, 1931, issue of The Excavating Engineer, sent **Operator George Utley** and their Bucyrus-Erie Gas+Air out to rescue automobiles and open up the roads, and Mr. Utley was kind enough to remember us with snapshots.

By GEORGE C. McNUTT

For years motorists in Berkeley have kicked about the roughness of Spruce Street, its irregular, deep-cut gutters and its old, worn-out pavement. Spruce Street was a blot on the otherwise well-paved street system of Berkeley. Now a Bucyrus-Erie Gas+Air shovel, owned by **Ariss-Knapp Company**, Oakland, is helping to change that situation. The job is no easy one. It consists of stripping off old pavement to a depth of about 1½ feet, missing flocks of pipes and mains (that requires real accuracy and skill), and clearing to level from gutter to gutter. But the Gas+Air is equal to the task, leaves little work being required for finishing for paving. Trucks on the job are Pierce-Arrows. Contract price for the job is about $120,000; Ariss-Knapp Co. is subcontracting from Central Paving.

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Hayward Buckets desire positions in the services of concerns seeking digging economy. Address The Hayward Company, 52-54 Church St., New York, N. Y.
Hayward Buckets

A Bucyrus-Erie Gas+Air owned by **J. Catucci**, Oakland, is shown excavating in Oakland, doing its bit to add to Oakland's port facilities. It is loading material for making a fill at Oakland's new Ninth Avenue docks, where the Coos Bay Lumber Co., big Pacific Coast lumber firm, will shortly build a $100,000 terminal. On the job besides the Gas+Air are seven Mack trucks, a Fageol, a Sterling, a General Motors, and a "Caterpillar" Thirty with bulldozer. They're

MEETING PLACE OF CAPITAL AND LABOR
THE KOENIG LABOR AGENCIES
Established 1875
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612 Walnut Street
Main 2766 and 2767
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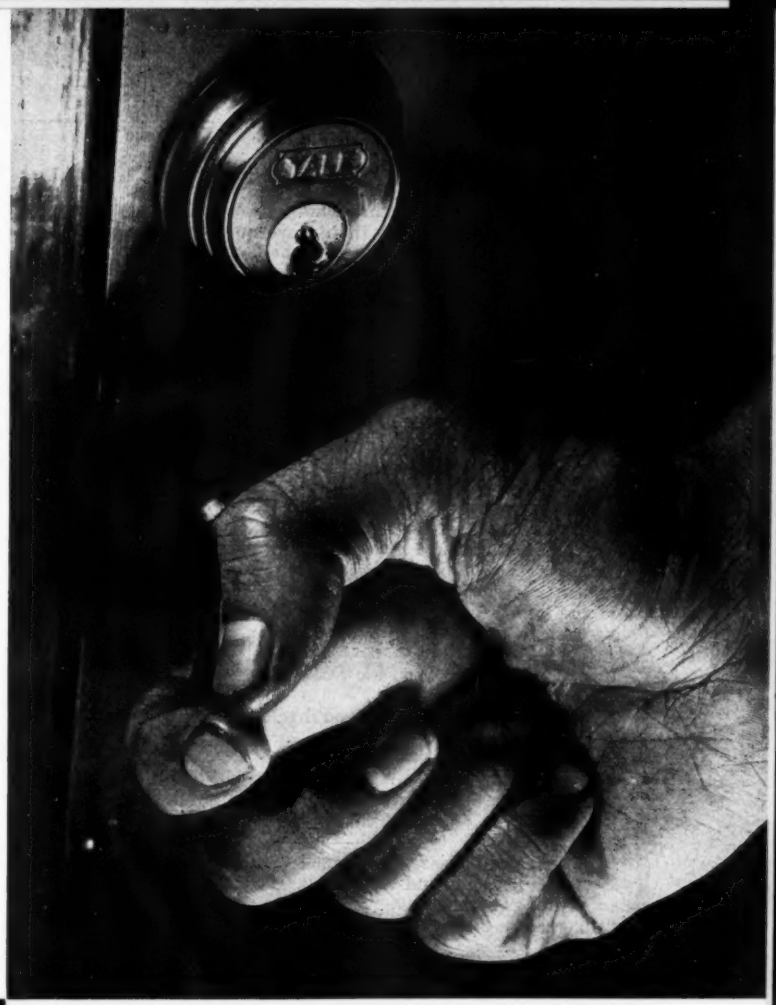
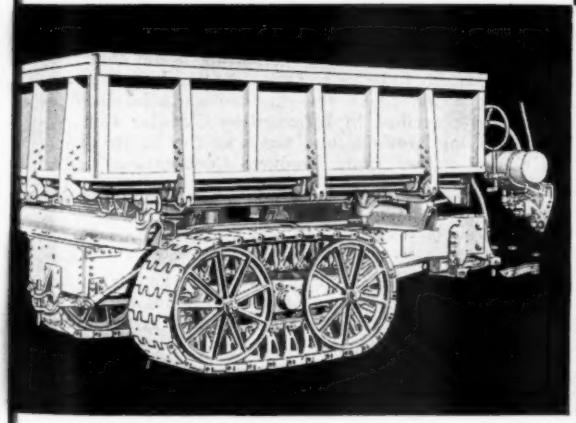
HELP OF ALL KINDS FURNISHED FREE

OPEN THAT DOOR!

Open the door to LOWER COSTS . . . ve yourself the "breaks" at the shovel and mp . . . with the Athey Truss Wheel Way Dump Trailer. "Bale in" your loads thout careful spotting—for the 3-Way has BIGGER top opening. Get the advantage *lower* loading height. Turn short and fast . dump over fills or around culverts. Put e material exactly where you want it, with actically no bulldozing.

Remember, the new 3-Way has EXTRA ength in every part, to last longer and wer your maintenance costs. Don't overok this opportunity—be sure to investite the Athey 3-Way, before you buy any uling or dumping equipment. Write toy for complete information.





- A NEW "3-WAY"—STRONGER AND HEAVIER—GREATER SIMPLICITY
- SIDES AND ENDS OF ¼" STEEL PLATE—HEAVILY REINFORCED
- IMPROVED TYPE OPERATING MECHANISM—POSITIVE, DEPENDABLE CONTROL
- 37 OTHER NEW MECHANICAL REFINEMENTS AND IMPROVEMENTS
- 7-8 YARD UNIT EQUIPPED WITH 20-TON ATHEY TRUSS WHEELS
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ATHEY TRUSS WHEEL CO., CHICAGO, ILLINOIS

Dept. A, 130 North Wells Street Cable Address: "Trusswheel" Chicago

ATHEY
TRUSS WHEELS

Shots From the Firing Line — *Continued*

putting that fill in mightly quickly—the Gas+Air loads 7 yards into those trucks each trip.

Granfield, Farrar & Carlin, San Francisco, are getting ready to start operation on their Government highway job in Yosemite Valley, but have been held up due to a very late spring. Two feet of snow fell on their job on May 7 which is a very unusual occurrence at that time of the year.

Bids will be called for very shortly by the California Highway Commission for **six miles of grading in Santa Cruz County** from Inspiration Point to Scott's Valley. Inasmuch as this job will call for the excavation of 800,000 cubic yards or more of material, it should be of great interest to highway contractors.

Los Angeles and Vicinity

By D. BANKER

Hanawalt Brothers were busy the first week in May excavating for footings and grading the site for the new $204,000.00 grandstand being erected at Pomona for the Los Angeles County Fair Association. C. T. and W. P. Stover hold the general contract for the building, which is to be completed in time for the annual fair in September.

Pitman: I've been here for five years doing three men's work—how about a raise?

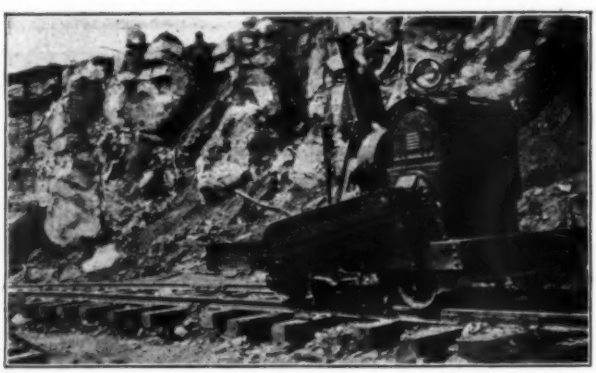
Boss: Can't do that, but if you'll tell me who those other two guys are, I'll fire 'em.

"I see in the paper that a widower with nine children out in Nebraska has married a widow with seven children."

"That was no marriage. That was a merger."

"Did you know, dear, that tunnel we just passed through was two miles long and cost $12,000,000?" said the young man to his sweetheart.

"Oh really, did it?" (pause) "Well, it was worth it, wasn't it?"



Shifting Track in the Quarry

Whether it is in the quarry, or on the waste dump where the overburden is disposed of, this machine and a few laborers will do all the required shifting and raising of track.

No large track gang need be maintained. Other operations need not be delayed waiting for track to be moved, or men taken from regular duties to work on track. Modernize your track raising and shifting operations with the Track Machine. It will save time and labor expense.

NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED
TRACK SHIFTER

BOOK REVIEWS

The Conservation Branch, U. S. Geological Survey, Department of Interior, has issued an advance synopsis of Water-Supply Paper 657 entitled **"Utilization of Water Resources of Snake River Basin,"** together with detailed map.

A bulletin covering the performance of Hocking Valley coal during a group of eleven boiler tests made in April and May, 1930, was received recently by the Book Review Editor. It is a 60-page, 6x9 bulletin presenting "An Economic Study of the Use of Hocking Valley Coal with Underfeed Stoker Equipment," by H. M. Faust, Research Engineer, **Engineering Experiment Station, Ohio State University,** Columbus, Ohio. The price of this bulletin is 50 cents.

The American Road Builders' Association presents in Bulletin No. 25, **Recent Practical Developments in the Design and Construction of Reinforced Concrete Pavements and Bases.** It is an attractive booklet, 6 by 9, and contains many illustrations. The Association's Headquarters are at Washington, D. C., in the National Press Building where inquiries should be directed.

The thirtieth edition of "How to Run a Lathe," a 160-page paper-bound book, has just been published by South Bend Lathe Works, South Bend, Indiana. It is an authoritative manual on machine shop work in general and on the care and operation of a modern screw cutting lathe in particular.

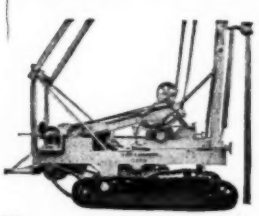
In this book will be found such information as, data on the erection and care of a lathe; application and care of lathe tools; cutting speeds of metals; centering work; machining on centers, on the face plate and in chucks; screw-thread cutting; taper turning and taper boring; milling in the lathe; using various attachments, etc.

Some of the new pages in this edition include information on motorized service shops; hints on grinding lathe tools; information on the use of small lathes and explanations of various motor drives for lathe equipment.

This book may be had by sending twenty-five cents in coin or stamps to the Technical Service Dept., South Bend Lathe Works, South Bend, Indiana.

The coyote or tunnel method of blasting is not commonly used in quarrying limestone. Occasionally, however, conditions occur which make this method suitable. Such an application is described in Information Circular 6599, entitled "Quarrying Methods and Costs at the Sloan Quarry of the United States Lime Products Corporation," issued by the United States Bureau of Mines.

This circular, written by R. E. Tremoureaux, consulting engineer of the United States Lime Products Corporation, describing the quarry operations of his company at Sloan, Nevada, is one of a series on quarrying methods and costs being published by the Bureau of Mines. Copies may be obtained free from the United States Bureau of Mines, Washington, D. C.



DELAYS ARE COSTLY

and eat up profits. Quick moving often means steadier drilling. Owners of Loomis Full Length Crawler Mounted "Clipper" drills report great satisfaction in their work.

Size 44 "Clipper" comes equipped with steel frame; steel or wooden mast, wire or manila line.

WRITE FOR FULL INFORMATION

Established 1842

THE LOOMIS MACHINE CO., K STREET TIFFIN, OHIO

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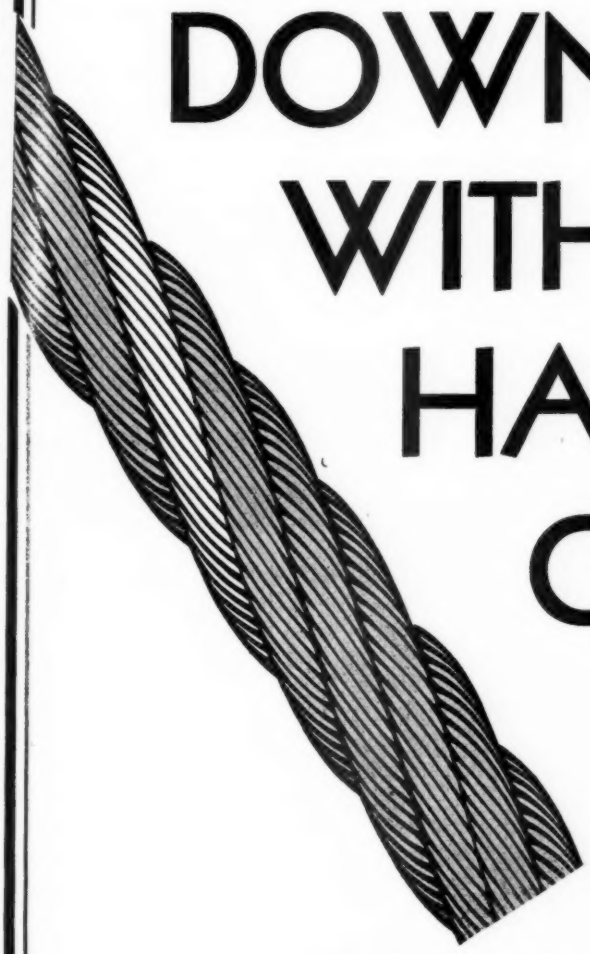

DOWN WITH HANDLING COSTS $ $ $

In these days of keen competition, contractors must keep their handling costs at rock bottom if they expect to stay in the game.

Are you dead sure the ropes on your machines are exactly right for the purpose? Try "Flex-Set" Preformed Yellow Strand and compare results. Then you will be sure!

All the wire for Yellow Strand is drawn to our own specifications from Swedish stock. It is rigidly tested and CAREFULLY SELECTED to provide the balance of elongation, tensile strength, tortions and bends that will result in longest life and economy.

Preforming eliminates the internal stress —makes the rope easier to handle and greatly increases its life and economy under many operating conditions.

All grades of B & B Wire Rope can be supplied "Preformed", as well as in the regular constructions.

Write for catalog 51.

BRODERICK & BASCOM ROPE CO.

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YELLOW STRAND WIRE ROPE

P-46

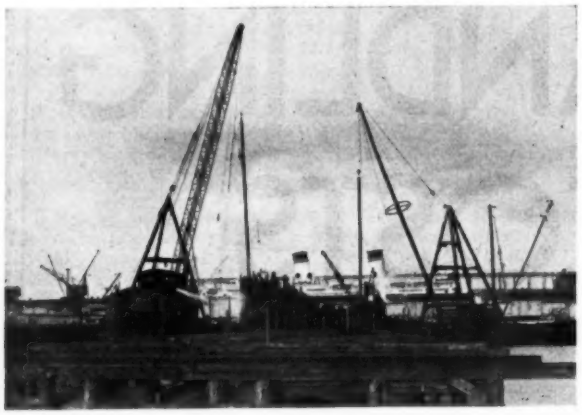
For your convenience in writing to Broderick & Bascom Rope Co., you will find a card bound in this issue.

World's Longest Cofferdam Completed

(Continued From Page 283)

verse rows for each cofferdam pocket and about nine piles per row. These wood piles were capped with 12 x 12's and across the 12 x 12's were placed the metal templates to guide the driving of the sheet piles at the pocket arcs. 24-inch I-beams rested on the 12 x 12's and portable decking was placed on the I-beams for holding the caterpillar treads of the 41-B cranes.

When one pocket was finished, the crane chugged ahead, picking up the portable decking from behind it and placing it in front on the 24-inch I-beams. The I-beams in the rear no longer required for holding the crane, were turned over to rest on the edges of their flanges and set to act as tracks for the Mack trucks that dumped the earth fill into the cofferdam pockets and the rip-rap on the shore side of the dam.



Two derricks setting sheet steel piling and trying to keep ahead of 41-B oil-burning Bucyrus-Erie crane. Piles and capping in foreground will be surrounded by sheet steel piling of cofferdam pocket and by the earth fill that is dumped in the pocket.

There were two rows of I-beams on the river side of the pockets and three on the shore side. The extra row on the shore side was for the trucks dumping rip-rap and their left wheels ran in the groove that the right hand wheels of the earth-dumping trucks used. The rip-rap tracks overhung the water on the shore side and rested on projections of the 12 x 12's previously mentioned.

Trucks carrying earth to fill the cofferdam pockets used the tracks directly over the pockets, of course. Several turning decks were provided so trucks could get off the dam promptly and return with another load.

5-yard to 10-yard Mack trucks brought about 600 loads of earth every 24 hours. Various excavations in all parts of the city contributed their share of earth—and at all hours of the day and night. Each pocket held about 4,000 cubic yards of earth.

The rip-rap bracing on the shore side of the dam is to be built up to about elevation plus 2. Some rip-rap has been brought from outside excavations, but most of it will be obtained from the 400,000 cubic yards of rock that must be excavated from the slips. The concrete foundations for the piers will also be filled up between the concrete walls and around the columns with rock from the slip bottoms. Excess excavated rock will be loaded on barges and towed away.

Cofferdam, earth fill, wood piles in pockets and the rip-rap embankment will all be removed when the pier foundations and the slip excavations are completed.

These men designed and built the cofferdam

John McKenzie, Commissioner of Docks, is responsible for the idea of doing the job and for many of the features in connection with its magnitude. Frank O'Keefe is the Chief Engineer for the Department of Docks and A. Duggan is the Resident Engineer at the job. H. A. Sloan, Inc., was Consulting Engineer for the contractors on the cofferdam.

Quite a job in itself was the diversion of the sewers at the foot of each street, which required trenching through rock for some portions of it and connecting up with existing sewers at the foot of each street, to discharge all outside of the area to be unwatered. This trenching and driving of single line sheet piling which connected the sheet pile cofferdam to seal the returns where they joined the existing sea wall was accomplished again with 41-B Bucyrus-Erie crane under the capable supervision of another of Allen N. Spooner & Son, Inc., engineers, Julian A. Dickinson, who, with Clayton B. Waite, were the men behind the guns that materially assisted in landing this job for Allen N. Spooner & Son, Inc.

First Newsstand Girl: "Say, did that guy take a Saturday Evening Post?"
Second Ditto: "Yes, but no Liberties."

"So your husband tried to get a government post? What is he doing now?"
"Nothing—he got the post."

She had just been hired for a job in the circus, and she said to the boss:
"Is there any particular advice you would like to give me about this work I am starting?"
"Well," said he, thoughtfully: "Don't ever undress in front of the bearded lady."

"Is Tommy's new dog a setter, or a pointer?" asked Mrs. Jones.
"He's neither," replied Tommy's mother. "He's an upsetter and a disappointer."

"What color bathing suit was she wearing?"
"I couldn't tell—her back was turned."

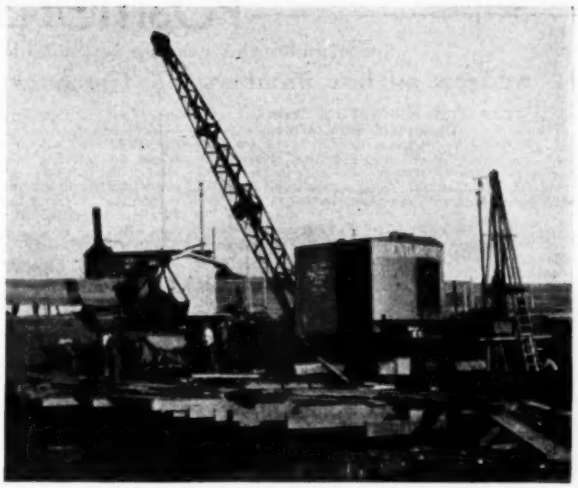
Excavating for foundations in Buenos Aires

(Continued from page 287)

the work was energetically carried out is shown by the fact that only 70 days elapsed from the time the enclosure was drained in preparation for excavation to the day concrete was poured. All of the silt had been removed and about 75% of the tosca by this time. In order to release men for other work, and because speed was required primarily to permit the concrete gang starting their program, the 1020 was operated only one shift toward the end of the job, which was sufficient to keep the excavation well ahead of the form and concrete gangs. The work was so well planned that the 1020 excavated the last few meters just as the concrete forms were ready to be laid down.

The firm of Arienti y Maisterra includes Sr. Zenon Arienti and Sr. Blas Maisterra, both of whom are well-known in Buenos Aires contracting circles, and the Chief Engineer in charge of the job was Ing. A. Gutierrez Acha, who kindly furnished the information given above.

The 1020 was not given a rest after the above 40,000 meter job, but immediately upon the completion of the work was moved some 10 kilometers to a suburb of Buenos Aires, where Arienti y Maisterra had a water pipeline contract. (Conducto de Impulsion a los Pueblos ribererios del Norte—Obras Sanitarias de la Nacion). Here the shovel equipment was replaced by a drag-shovel equipment to excavate a trench 90 cm. wide and from 2 to 4 meters deep (about 3 feet by 6½ to 13 feet) for a concrete pipeline destined to serve the populous suburbs north of Buenos Aires along the Rio de la Plata.



Excavator on temporary platform, with pile driving tower at left, and in background Orrenstein & Koppel steam boiler for pile driver.

PROOF OF REMARKABLE OVERLOAD CAPACITY

This Williams "Arch-Girder" Trailer of 20 tons rated capacity is handling a 36-ton shovel — and has plenty of strength to spare.

Movers of heavy equipment are buying this improved trailer because it has *extra strength without increased weight* and is easier and more quickly loaded.

WILLIAMS "Arch-Girder" TRAILER

Easier to Load, to Haul and to Stop

Write for Bulletin

THE WELLMAN ENGINEERING CO., 7002 Central Avenue, Cleveland, Ohio

Birmingham—New York—Chicago—Detroit—Pittsburgh—Mexico City

For your convenience in writing to The Wellman Engineering Co., you will find a card bound in this issue.

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wis.

TRANSITMAN — OFFICE WORK

Experienced transitman with mining experience desires transit work, or will work as rodman, chainman or engineer's helper. Have also had experience as timekeeper, and much experience in safety work. Good references. Located Wisconsin, will go anywhere. Box 3513.

SHOVEL OPERATOR

12 years' experience on Gas+Air and steam machines on highway grading and basement excavating. Willing to go any place in U.S.A. Married. Can do own repair work and furnish reliable references. Present location, North Carolina. Box 3301.

CLAMSHELL—DRAGLINE OPERATOR

6 years' experience on stripping and loading operations. Prefer operating Bucyrus-Erie dragline anywhere. Can make own repairs and furnish good references. Present location, South Carolina. Box 3501.

DRAGLINE — SHOVEL — CRANE OPERATOR

Have 100% rating in recent Federal Civil Service examination. Experience covers years on drainage, quarry, highway grading and mine stripping. Willing to go anywhere in U.S.A. Can do own repair work and furnish excellent references. Married. Present location, South Dakota. Box 3502.

SHOVEL OPERATOR

15 years' experience on railroad, highway and general excavating. Willing to go anywhere in U.S.A. Can do own repair work and furnish excellent references. Married. Present location, Illinois. Box 3503.

DRAGLINE OPERATOR

Experience covers 11 years' on Diesel and gasoline draglines on drainage, canal, levee and rock work. Expert gasoline mechanic, can build gasoline engines from the ground up. Willing to go anywhere in U.S.A. Married. 30 years old. Can handle own repair work and furnish A-1 references. Present location, Arkansas. Box 3504.

CRANE-SHOVEL OPERATOR

16 years' of experience operating gasoline and steam machines on highway and rock grading and general excavating. Prefer operating small gas or steam shovel anywhere in the East. Married. Age 36 years. Can do own repair work and furnish first class references. Present location, New York. Box 3303.

SHOVEL OPERATOR

Have ten years' experience on Gas+Air, gasoline and steam shovels. Willing to go anywhere in U.S.A. Married. Best of references. Can do own repair work. Present location, Wisconsin. Box 3203.

DRAGLINE-SHOVEL-CRANE OPERATOR

18 years' on gasoline, gas+air, Diesel and steam machines on general excavating, coal and ore stripping and highway grading. Will go anywhere. Married. A-1 references. Age 38. Present location, Illinois. Box 3404.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie Diesel, E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 3305.

DRAGLINE-SHOVEL OPERATOR

14 years' experience on Diesel, gasoline and steam machines on highway grading and levee building. Would like to operate dragline anywhere in U. S. A. Married. Can do own repair work. A-1 references. Present location, Arkansas. Box 3306.

CRANE-SHOVEL OPERATOR

Have 35 years' experience on gasoline and steam machines on highway and railroad grading; canal and quarry rock. Willing to go anywhere in U.S.A. on any size or make shovel. Married. Can furnish the very best of references and can handle own repair work. Present location, South Carolina. Box 3304.

DRAGLINE-SHOVEL OPERATOR

Have had thirteen years' experience operating Bucyrus-Erie 20-B, 30-B, 50-B and 175-B steam, Diesel and electric machines. Have built levees, road and railroad embankments; dug canals, gravel and stripped phosphate. Can furnish good references. Willing to go anywhere in U.S.A. or foreign countries. Present location, Louisiana. Box 3402.

DRAGLINE-CRANE-SHOVEL OPERATOR

Over ten years' experience on gasoline, Diesel and steam machines on drainage, levee and mine stripping. Willing to go anywhere. Single. Can do own repair work. Reliable references. Present location, Texas. Box 3212.

CLAMSHELL-SHOVEL OPERATOR

Thirteen years' experience on railroad, canal, highway, street and basement excavating. Can carry A-1 grade and produce yardage. Can do all necessary repair work and furnish reliable references. Present location, Ohio. Box 3209.

DRAGLINE-SHOVEL OPERATOR

8 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U.S.A. Also have two years' machine shop experience. Can do own repairing and furnish A-1 references. Present location, Florida. Box 3406.

DRAGLINE-SHOVEL OPERATOR

Experienced on Diesel, Gas+Air and gasoline machines on highway grading and pit stripping. Willing to go anywhere in U.S.A. or South America. A-1 references. Can do own repair work. Present location, Florida. Box 3207.

SHOVEL OPERATOR

18 years' experience on Erie, Osgood, Thew and Marion machines on highway, basement, railroad and general excavating. Willing to go anywhere. Can take complete charge of repairing. A-1 references. Present location, Ohio. Box 3509.

DRAGLINE — SHOVEL OPERATOR

Experience covers 15 years' on Diesel, gasoline and steam machines on drainage and levee work, pit work, and highway grading. Prefer dragline work anywhere in U.S.A. Can do own repairing. Married. Present location, Iowa. Box 3510.

DRAGLINE—CRANE—SHOVEL OPERATOR

16 years' experience on drainage work, railroad and highway grading. Will go anywhere on any type and make machine. Can do own repair work. Married. Present location, Indiana. Box 3511.

DRAGLINE—CLAMSHELL—SHOVEL OPERATOR

18 years' experience on electric, gasoline, Diesel and steam machines on all classes of work. Will go anywhere in U.S.A. Can do all own repair work. Married. Reliable references. Present location, Illinois. Box 3512.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

22 years' experience on Gas+Air, gasoline and steam machines on highway, coal stripping operations, irrigation work, pile driving and many other miscellaneous jobs. Will go anyplace in U.S.A. Can handle own repair work. Married. Can furnish excellent references. Present location, New York state. Box 3405.

DRAGLINE-CLAMSHELL OPERATOR

Experience covers years on Diesel and gasoline machines on levee and highway work. Willing to go anywhere in U.S.A. Single. Age 27. Can do own repair work and furnish reliable references. Present location, Louisiana. Box 3403.

SUPERINTENDENT-DRAGLINE OPERATIONS

Have superintended dragline and shovel work for many years on mining operations of various types, also rock quarries. Willing to go anywhere in U.S.A. 43 years old. Have excellent references regarding character and ability. Present location, Tennessee. Box 3211.

DRAGLINE OPERATOR

18 years on Diesel, gasoline and steam draglines on levees and canals. Will go anywhere on any make and model machine. Married. Can handle own repairing. Reliable references. Present location, Louisiana. Box 3508.

EXCAVATING SUPERINTENDENT

Have years of experience as superintendent on all types of excavating work on large scale. Understand the building and operating of sand screens up to 50 carloads per day. Can operate gasoline and steam machines—Bucyrus-Erie preferred and can handle own repairing. Hold U. S. Civil Service rating of 91%. Can furnish excellent government references. Married. Present location, Maryland. Box 3213.

CLAMSHELL-SHOVEL OPERATOR

Experience covers twenty-one years in quarry, sand and gravel loading. Prefer operating Bucyrus-Erie steam shovel in central states. Can do own repair work. Excellent references furnished. Married. Present location, Ohio. Box 3208.

SHOVEL OPERATOR

Have 13 years' experience on Diesel, gasoline, Gas+Air, electric and steam machines on highway and railroad grading, quarry work and general excavating. Married. Willing to go anywhere. Can do any repair and service work. Familiar with Diesel engines. Reliable references. Present location, Tennessee. Box 3307.

HOPPER OPERATOR

Wanted—Bachelor job as hopper operator on road work. Fully experienced on all types of highway building. Can also serve as tractor operator. Single. 30 years old. Willing to go anywhere in U.S.A. Reliable references furnished. Present location, Indiana. Box 3308.

DRAGLINE-CRANE-SHOVEL OPERATOR

Have nine years' experience on gasoline, electric, Diesel and steam machines on highway, subway, sewer and hydro-electric work. Prefer operating gas or Diesel machine any place. Married. Can do own repairing. At present located in New York State. Box 3205.

DRAGLINE-CRANE-SHOVEL OPERATOR

Experience covers eighteen years on large and small gasoline, Diesel and steam machines on general excavation, scow loading, lock and dam excavating. Willing to go anywhere on large or small machine. Married. Can furnish excellent recommendations. Fully capable of handling any repair work on machines. Present location, Illinois. Box 3206.

CONSTRUCTION AND MAINTENANCE ENGINEER

Over 25 years' experience on all types of shovel, cranes, locomotives on general construction work. Capable of taking full charge of crew. At present located in Australia. Available for work in New Zealand, China or Federated Malay States. Can furnish excellent recommendations. Address replies to W. J. A., 22 Ruthven Street, Waverly, N. S. Wales, Australia.

DRAGLINE-SHOVEL OPERATOR

Have twelve years' experience on Bucyrus-Erie, Monighan, Marion, Osgood, Northwest, Koehring, Link-Belt and P. & H. shovels and draglines—steam—Diesel and gasoline on drainage, quarry and ore pits and on general excavating. Willing to go anywhere in U.S.A. or foreign countries. Can do own repairing and furnish reliable references. Present location, Indiana. Box 3401.

SHOVEL OPERATOR

Have operated Bucyrus-Erie 320-B and 750-B electric stripping machines for past seven years. Willing to go anywhere in U.S.A. Can do own repair work and furnish A-1 references. Married. Present location, Illinois. Box 3505.

CLAMSHELL—CRANE—SHOVEL OPERATOR

Experience includes 14 years on gasoline, electric and steam machines on all types of excavating. Willing to go anywhere on any type machine. Can do own repair work and furnish reliable references. Single. Present location, Pennsylvania. Box 3506.

CLAMSHELL — CRANE OPERATOR

Have 14 years' experience on steam machines on all types of general excavating. Will go anywhere on any kind of work. Can do own repairing and furnish excellent references. Married. Present location South Carolina. Box 3507.

DRAGLINE-SHOVEL OPERATOR

Experienced on Bucyrus-Erie D-2 and 30-B Diesel machines, on highway grading and canal drainage. Will go anywhere. Married. Age 37. Reliable references furnished. Can handle own repair work. Present location, Kentucky. Box 3204.

Not in the Contract!

No excavating contractor can accurately forecast weather conditions. He can not work into his bids the provision for the delays and extra expenses caused by abnormal rains.

But he can employ the Bucyrus-Monighan Walking Dragline, which negotiates soft, wet ground when other machines can't move.

The machine is supported entirely on its large circular base when digging, and the walking treads are raised clear of the ground.

When ready for a move, the treads are lowered and find a bearing on untrodden, unchurned ground. Bucyrus-Monighan Company, Chicago, Illinois.

Sold by **BUCYRUS-ERIE COMPANY, South Milwaukee, Wis.**

Representatives throughout the U. S. A. Branch Offices: Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit, Chicago, St. Louis, Kansas City, Dallas, San Francisco Offices or Distributors throughout the world.

BUCYRUS MONIGHAN

Walking Draglines 1 to 10 cubic yards

B-23

For your convenience in writing to Bucyrus-Erie Company you will find a card bound in this issue.

Heavy Work on Ute Pass Road

(Continued From Page 288)

of static sparks. The powder was poured into a funnel inserted into a hole at the back end of the brass tube, where a valve was located for regulating the air pressure. By this method a great deal of time was saved in loading the holes, especially on lift holes, which are more difficult to load. Over half the blasting was on the east 1½ miles of the project. Total yardage moved was approximately 200,000.

Water storage tanks placed on side of mountain

Two gasoline pumps, moved along the creek, furnished water to steel storage tanks on the mountainside, from which the steam shovels drew it by gravity. Horse-drawn tank wagons were used occasionally in isolated places. Six Coleman trucks, two Whites, four Macks, one Linn tractor and an Athey crawler wagon pulled by a Sixty Caterpillar, were used on the job. Finishing of the roadway was done by hand, and with teams and fresnos, using six inches of fine stone from selected borrow pits on the right-of-way. Cement rubble retaining walls were used in several places to hold the fill out of the stream bed, and a neat guard rail fence was installed along much of the roadway.

The project starts at the town of Manitou, about whose bubbling mineral springs many Indian legends have been handed down. The area was marked by Indian tribes of early days as a neutral zone, where any and all warring people could meet in peace, it being understood that the "Great Spirit" frowned upon fighting near the springs. The trail through the pass was used successively by game, Indians and the wagon trains of white pioneers on the way to the Pacific coast. Later a railroad was built up the pass to the Cripple-Creek gold fields, and an automobile road, which became a part of South 40, followed in due time.

Love makes the world go round. But for that matter, so does a good swallow of tobacco juice.

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City Editor—Did the man bite the dog?
Reporter—Naw, a bull threw a congressman.

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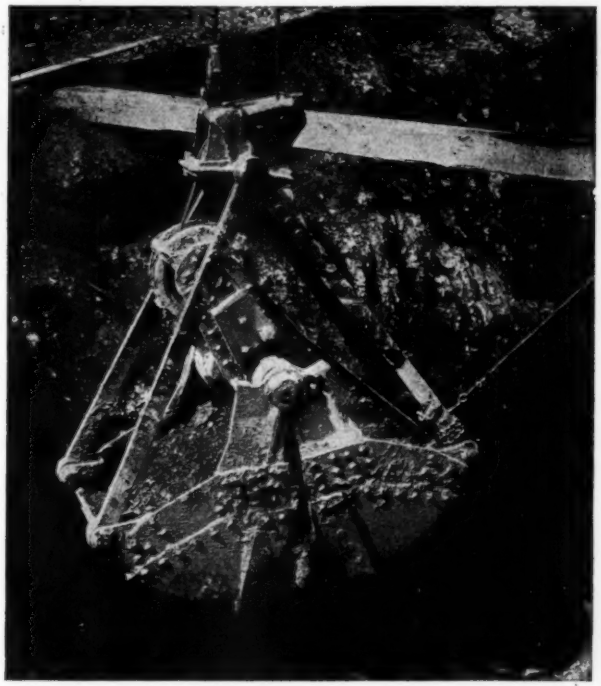

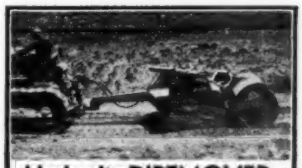

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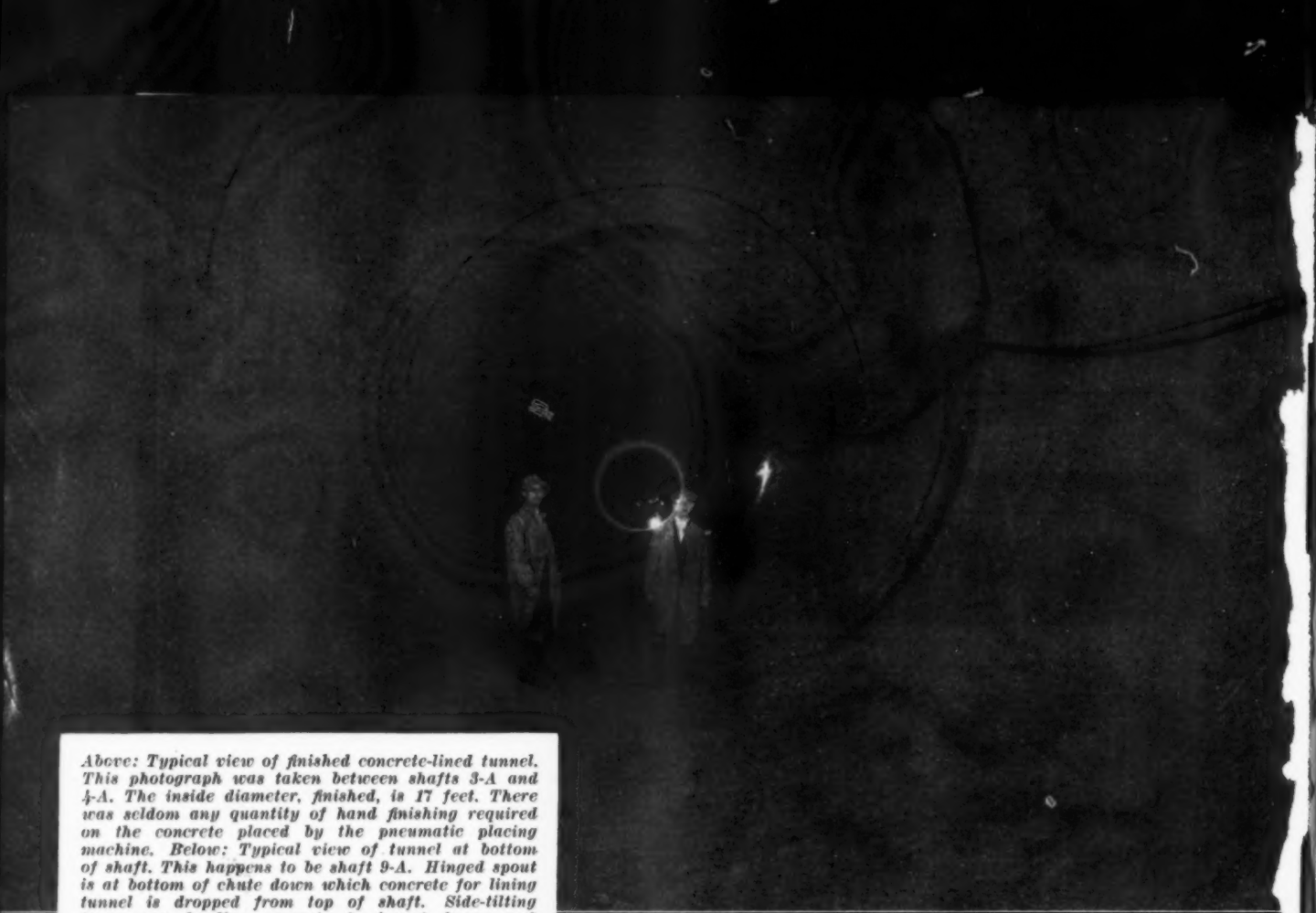
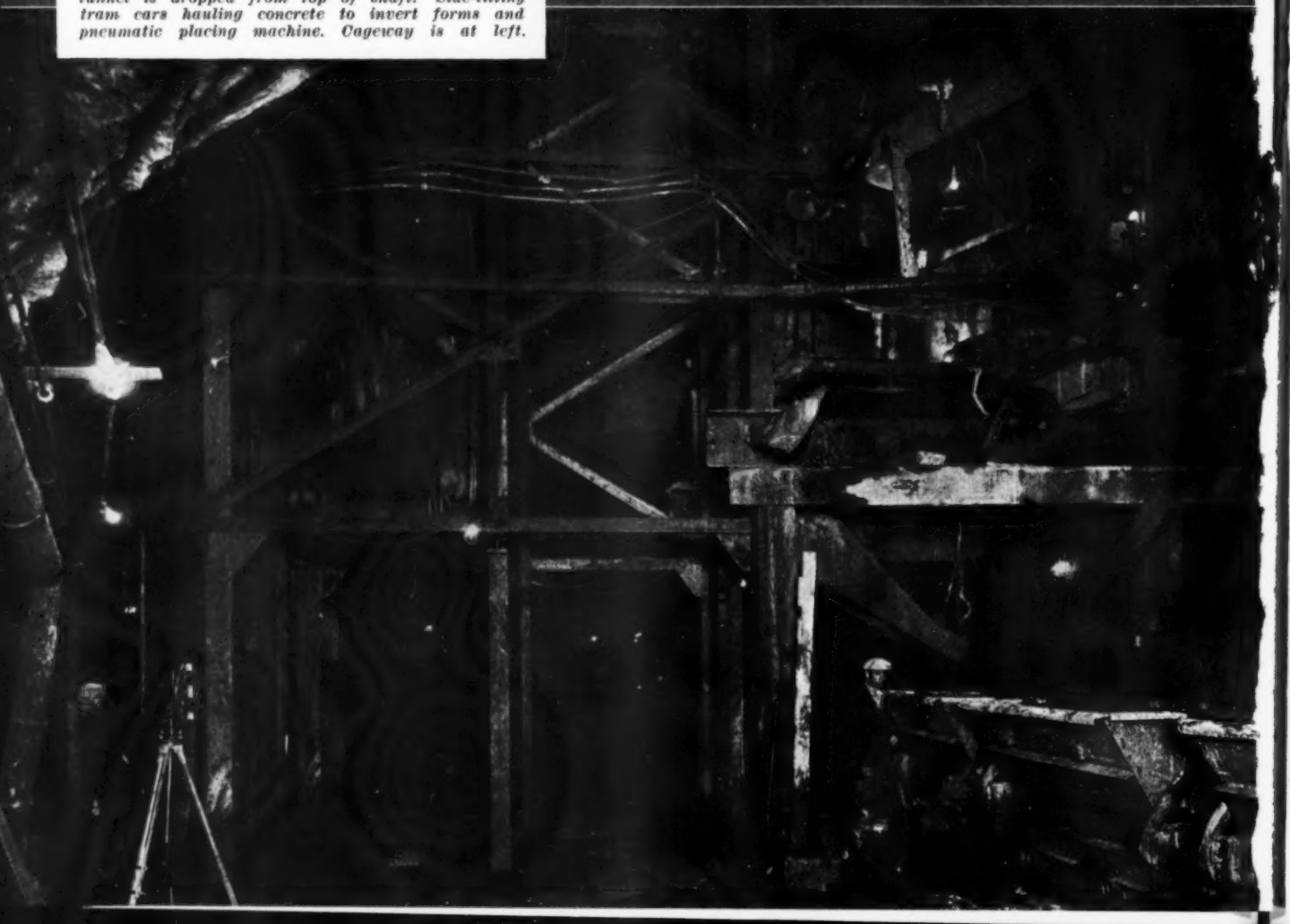
Above: Typical view of finished concrete-lined tunnel. This photograph was taken between shafts 3-A and 4-A. The inside diameter, finished, is 17 feet. There was seldom any quantity of hand finishing required on the concrete placed by the pneumatic placing machine. Below: Typical view of tunnel at bottom of shaft. This happens to be shaft 9-A. Hinged spout is at bottom of chute down which concrete for lining tunnel is dropped from top of shaft. Side-tilting tram cars hauling concrete to invert forms and pneumatic placing machine. Cageway is at left.